THE IRON AGE

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Reading Matter Contents.....page 662
Alphabetical Index to Advertisers " 184
Classified List of Advertisers " 174
Advertising and Subscription Rates " 673

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See page 54

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SEE PAGE 27

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THE RIVERSIDE METAL CO.

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THE IRON AGE

New York, Thursday, August 26, 1909.

Suspension Railways in German Iron Works.

BY C. VAN LANGENDONCK, BRUSSELS.

During recent years the use of wire rope tramways and suspension railways has increased remarkably, chiefly because they can be hung at any hight and do not encroach upon space which can be employed for manufacturing purposes. The wear is slight, as all delicate parts are out of reach of the material carried, and cannot, therefore, be fouled by it; the material comes in contact only with substantial car buckets. Improvements have made possible not only vertical, but horizontal deflection of the cars without detaching them from the rope or track, giving them a greater range of action than most other conveyors. An exceptionally small staff of attendants is necessary, and the material is not unduly damaged, because it remains in the same receptacle from the start to its destination.

The suspension railway with electrical single drive of the cars is even more adaptable than the wire rope tramway and requires fewer attendants, as the cars can be run automatically. All pushing of the cars between the loading and coupling point is done away with; the attendant can stop the cars at any desired point and restart them through the control of a switch. The cars must run singly and not in trains, however, so as not to concentrate too heavy a load at one point, and as it is impracticable to supply an operator for each car, they must necessarily run automatically without colliding at the switches and crossings. If one car approaches another too closely on the open track or at crossing points it is stopped by the first car cutting off the current from that section, and it starts again automatically when the first is safely out of the way. This is of special importance at the loading station, because cars must often wait there for some time.

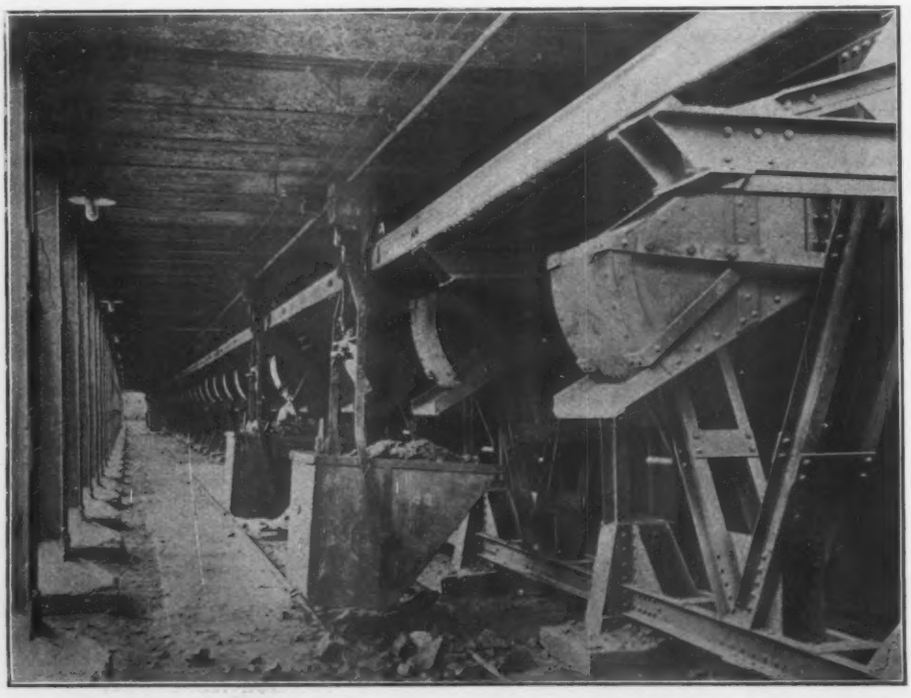
In the electrical single driving system the cars run automatically from the loading point to the beginning of the ropeway and again from the terminus of the inclined plane to the furnace. Only the opening of the hopper escape gates and the tipping of the cars require manual labor. The cars couple automatically, without stopping, to the traction rope at the foot of the gradient, and uncouple automatically again at the top. On the inclined section the current is broken. This combination of electric and rope driving is of especial importance for those works in the original layout of which the transport of material was not the main question, as the system can be developed according to requirements, even under the most unfavorable conditions. The pockets can be put up at any distance from the furnaces and separated from them by shops, such as the foundry, blowing house, &c.

Generally the materials most difficult to transport should be stored or worked nearest the furnaces. With modern appliances, ores, limestone and coke may be included among materials easily handled. The piping of compressed air and the handling of pig iron occasion much greater difficulties and expenses. Nowadays the main points to be considered in designing new works are very different from those of earlier days. It is now possible to give particular attention to the convenient arrangement of the casting and blowing houses, and the handling of raw material is no longer the primary consideration.

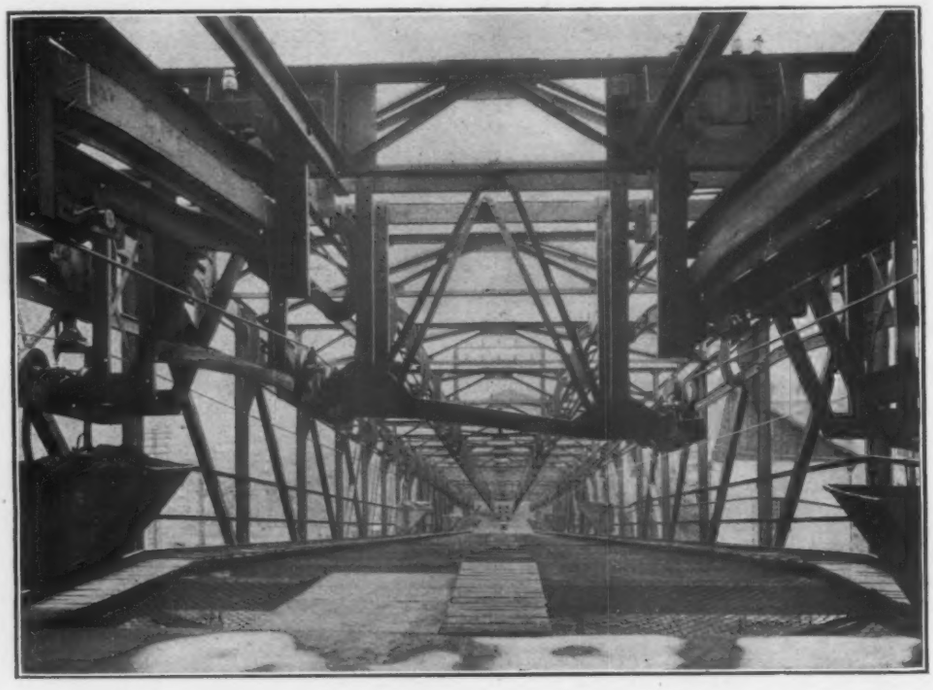
General View of the Suspension Railway System in the Stumm Works, Neunkirchen, Germany.—In the Middle Background Is the Ore and Limestone Loading Station; Just in Front of it the Collecting Siding, and from the Latter in the Right Foreground the Incline Leading to the Charging Platform.

An example of a systematic plant is the one built a few months ago by Adolf Bleichert & Co. of Leipzig, for Gebrüder Stumm, Neunkirchen, Germany, of which views are given herewith. Ore and limestone are delivered in railroad cars and are placed in pockets under which the electric suspension railways run. From here the material is drawn off into the suspension cars by chutes with special gates, and run first over an automatic weighing machine and then to the collecting siding. Here the cars are divided, according to the kinds of ore carried, and placed on the various lines by setting the

switches, until the attendant stationed at the starting station of the wire ropeway puts them in motion by switching on the current, so that they couple on to the traction rope. The cars are now hauled up to the charging platform, uncoupled automatically, and are directed to the various furnaces by the attendant here in charge, who has only to set the switches correctly. The cars are then tipped over the mouths of the furnace, return to the wire ropeway and run down the rope again. At the foot all cars arrive on the section running beside the hoppers to the other end of the hopper building, where by setting the switches they are transferred from the cross line to one of the three loading sections. A reserve is provided by arranging the wire ropeway as a double line. These two lines, however, are not simply laid side by side, as it would in this case be impossible to avoid the rails crossing on the charging platform, but are so arranged that the two tracks of one ropeway lie outside and those of the other ropeway inside. Compared with the old working with vertical lifts in the Stumm Works, there is a saving of 50 men on every shift, although for the present the new method is only employed for the conveyance of ores.



A View in the Loading Station.—At the Right Are the Pockets from Which Through Gated Chutes Limestone and Ore Are Discharged Into the Electric Suspension Railway Cars.



View Looking Down the Incline from the Charging Platform.—Here the Cars Are Uncoupled Automatically from the Haulage Ropes and Proceed Under Their Own Power at the Direction of an Attendant to the Various Furnaces.

The L. A. Green Company, 419-420 Park Building, Pittsburgh, dealer in new and relaying rails, machinery, &c., has secured the agency for the Ernst Wiener Company, New York, and will handle its line of industrial cars, portable equipment, rails, &c., in western Pennsylvania and all of Ohio, West Virginia and Kentucky.

The United Engineering & Foundry Company, Pittsburgh, has received a contract for 12 stands of hot rolls, four stands of cold rolls and the necessary roughing rolls required in an addition to the sheet mill capacity at the plant of the Inland Steel Company, Indiana Harbor, Ind.

Manufacturing by a Municipality.

The Cost of Valves to the Boston Water Department.

The recently published report of Metcalf & Eddy, consulting engineers to the Boston Finance Commission, contains some interesting information regarding the cost of manufacturing gate valves, hydrants and similar goods in a machine shop maintained by the Boston Water Department. Investigation immediately disclosed laxity in discipline, inefficiency in work and inaccuracy in the accounting system. It was at once shown that no allowance was made in the latter for holiday and sick leave with pay for supervision, clerical service, fuel, oil, tools, engine room labor and other general expenses, nor for interest and depreciation. It was brought out that the actual cost of labor (including general expenses) was 93 per cent. in excess of that shown by the books. Comparative values of the following items are shown by the accompanying curves:

1. The cost to the Boston Water Department in the year 1907 of each size of valve manufactured, as obtained from the department's books.

2. The true cost of such valves after adding labor cost of holidays and sick leave, shop superintendents and shop administration, and interest and depreciation charges upon shop and plant devoted to this work.

3. The cost of the metropolitan water works gates under their last purchase, with the dates of such purchases. (It is to be noted that most of these purchases were in 1902 and 1903, when prices were less than at the time of this report.)

4. Prices at which "commercial valve A" could have been bought in 1907. (This is the heavy stock pattern of gate, the weight of which approximates that of the Boston valve.)

5. Prices at which "commercial valve B" could have been bought in 1907. (This valve is of the ordinary weight of stock valves.)

6. Prices at which the engineers estimate the Boston valve could have been bought by contract in 1907.

Certain facts regarding the manufacture of gate valves are also presented in Table 1. These valves, which were all of special design by the city engineer, are extra heavy, varying but little in weight from the extra heavy commercial type marked "A" in the diagram, although considerably heavier than the stock patterns of most makers designated "B."

The cost of hydrants is presented in Table 2. These are all of special design, and are not at all comparable with the commercial types. No contract prices were presented by Metcalf & Eddy, but it is pointed out that the labor cost being relatively slight in proportion to the total cost, the disadvantage of the municipal shop would not be as great as in the case of the gate valves.

Table 1.—Cost of Boston Waterworks Gate Valves in 1907.

Size.—Inches.	Number made	Cost of—Direct labor.	Cost of—Stock.	Total true cost to city, including interest and depreciation.	Total for year.
3	15	$4.83	$7.87	$18.40	$276
4	45	7.74	9.76	26.40	1,188
6	25	10.38	17.32	39.96	999
8	67	11.00	25.26	49.65	3,325
10	49	18.75	38.05	79.40	3,890
12	39	18.30	47.55	88.50	3,450
16	15	36.94	68.04	147.00	2,205
20	3	68.72	182.36	337.00	1,011
24	2	86.97	204.37	398.00	796
Totals	260				$17,140

Table 2.—Cost of Hydrants Made in Boston Waterworks Shops, 1907.

Kind of hydrant.	Number made.	Total true cost.	Total cost per year.
Bachelder	84	$81.80	$6,870.00
Slide valve post	4	80.20	320.80
Boston Lowry	20	29.60	592.00
Lowry, 3 ft. 3 in	12	43.05	517.00
Lowry, 3 ft. 6 in	3	43.55	130.65
Lowry, 4 ft.	4	44.50	178.00
Lowry, 4 ft. 3 in	10	45.55	455.50
Lowry, 4 ft. 6 in	10	46.55	465.50
Lowry, 4 ft. 9 in	2	47.30	94.60
Lowry, 5 ft.	1	47.60	47.60
Lowry, 5 ft. 3 in	7	48.00	336.00
			$10,007.65

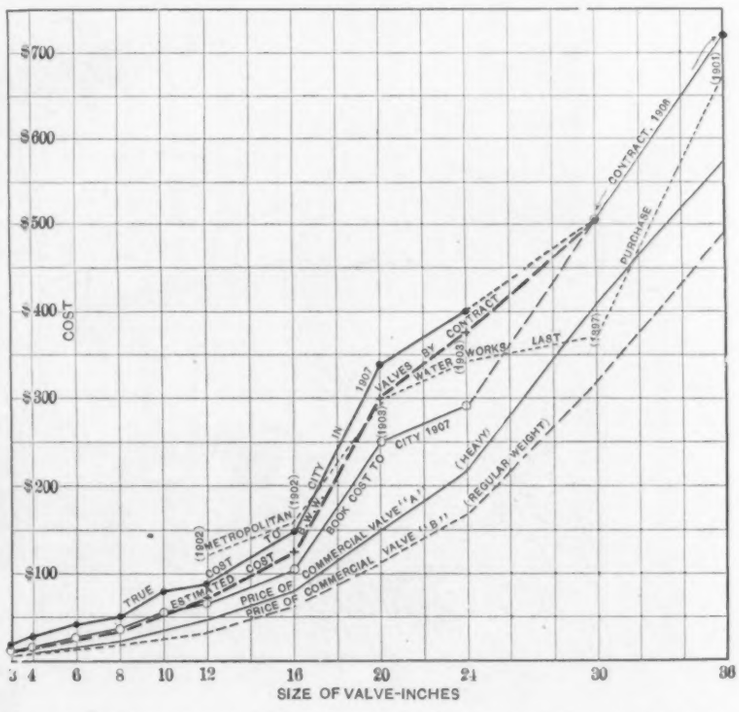


Diagram of True and Book Costs of Valves to Boston Water Works in 1907, with Comparisons.

German Iron Workers' Wages.—Consul George Nicholas Ifft of Nuremberg reports as follows to the Department of Commerce and Labor concerning the prevailing wages in the South German iron and steel industry in 1908: "The South German Iron and Steel Association (Berufsgenossenschaft), which comprises 12,493 concerns, employing 210,689 workmen, reports the average yearly earnings of a fully employed journeyman workman during the year 1908 at $283.94, as compared with $280.13 in 1907, an increase of $3.81 for the year. Not counting Sundays and deducting 20 days for holidays, it will thus be seen that the average daily wages of the journeymen workmen in the South German iron and steel industries was less than 97 cents. While even this was a slight increase for the workman lucky enough to have steady employment, there was, however, during the year less employment to be had than in 1907."

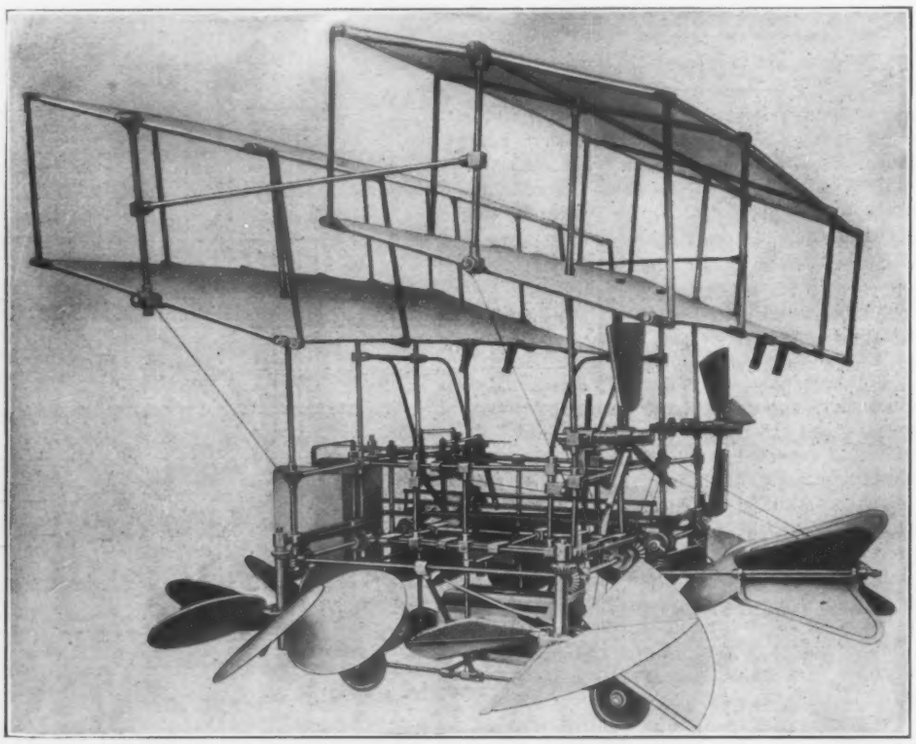
The Liggett Spring & Mfg. Company.—At a recent meeting of this company the following officers were elected: Edwin S. Marston, New York, president, to succeed Wm. G. Park, deceased; Wm. B. Cardozo, New York, vice-president; H. R. McMahon and J. H. Neihart, both of Pittsburgh, vice-president and general manager and secretary and treasurer, respectively. These officials and D. E. Park of Pittsburgh constitute the Board of Directors. The company's main office is in Pittsburgh and the plant is located at Axleton, near Monongahela, Pa., where it manufactures a general line of springs and axles. It is heavily increasing its output of springs and axles for automobiles.

The Aeromobile, a Novel Heavier-Than-Air Machine.

Bleriot's recent flight across the English Channel, Latham's nearly successful attempt at the same feat and the even more pronounced successes of the Wrights in the Government tests at Ft. Myer, Va., last month, have brought the subject of mechanical flight into special prominence of late. Airships or dirigible balloons may be considered to have almost passed the experimental stage and in their design to have attained some semblance of standardization. Their performances in the past year, and notably those of the Zeppelin II in Germany, have demonstrated their practicability in covering long distances. Flying machines or heavier-than-air machines, variously classified as aeroplanes, orthopters, helicopters, &c., show a greater diversity of form and involve more complicated problems. Now that satisfactorily light and fairly reliable engines are available, the principal difficulty is stability. It requires the constant vigilance of the aviator to keep the present forms of flying machines on an even keel. They must be balanced not only fore and aft, but right and left, requiring a degree of skill that is not called for in navigating a dirigible. The reason, and one seemingly without explanation, is that designers have so far persisted in making the center of gravity and the center of suspension practically coincident—*i. e.*, they have concentrated the weight very close to the supporting surfaces of the planes. This is true of the Wright, Curtiss and Farman biplanes, in all of which the engine and the operator are located between the planes.

A machine proposed which departs from this practice is shown in the illustration, the engine and operator being well below the planes, where their weight will act as a balance, just as a boat is balanced by its weighted keel or a balloon or airship by the basket or car. This machine is further of interest because it is something of a hybrid, being a combination of an aeroplane and helicopter. It is the invention of Bruno von Bültzingslöwen of New York, and a model of the machine is now on exhibition at the Autolyte Mfg. Company's office and store, 26 Warren street, New York City. While no full size machine has been built as yet, nor even a model that has flown, it contains so many interesting mechanical features sufficiently near in principle to those which are known to be right from experience to practically insure its success before trial that it seems appropriate to add its description to the list of articles which have already appeared in *The Iron Age* dealing with aerial navigation.* Plans are now under way to build a machine of the dimensions given later, and it is hoped that an actual test may be made in the near future.

The aeromobile "Luisel," as it is called, is designed to leave the ground by its own power from any spot and to be capable of easy and safe handling even in a heavy wind. It is smaller than the familiar machines of corresponding carrying capacity. The frame is to be 6 ft. 8 in. long, 4 ft. 10 in. high and 2 ft. 10 in. wide. This will be made of light steel tubes and mounted on four 18-in. bicycle wheels. In the center of the frame will be a movable seat for the aviator and below him a motor of 36 hp. On each side of the frame will be two horizontal rotary wings or helicopters, each 6 ft. in diameter and intended to run at 120 rev. per min. In the view of the model two types of helicopters are shown; it is the intention to use all of the same kind, however, and probably the four-bladed type shown at the right. The unique feature of the helicopters is that the blades can be turned on their radial axes, so that in ascending they may be set at an angle, and then for forward flight they will be folded flat and take their share of the load with the main planes. They will continue to revolve, however, and it is believed that their gyroscopic effect will be a further assistance to stability.



The Aeromobile Luisel, Invented by Bruno von Bültzingslöwen, New York.

At the front and back, 4 ft. above the frame, will be located two double flying planes, the upper and lower ones 3½ ft. apart, and all controlled simultaneously by a single lever to tilt them to any angle. Each of the four planes will be 6 x 15 ft. in area, making their combined area 360 sq. ft., which with the 160 sq. ft. of the four helicopters will make a total of 560 sq. ft., or the same as that of the Wright machines. At the back of the frame, about midway between top and bottom, two three-bladed propellers will drive the machine forward and at the forward end a rudder will guide the machine right and left. Everything will be controlled by the aviator from his seat in the middle of the frame. Including the planes and helicopters, the over-all dimensions

* "The Present Status of Military Aeronautics," by Major George O. Squier, U. S. A., December 3 and 10, 1908.
"The Conquest of the Air," by J. F. Springer, January 7, 1909.

of the aeromobile will be 12 ft. 8 in. long, 15 ft. wide and 12 ft. 2 in. high, and it will weigh about 750 lb.

In starting from the ground the four helicopters will be assisted in lifting the weight of the machine by setting the propellers in motion and tilting the upper flying planes. In a normal descent the engine would be stopped or disengaged and the machine, under the control of the planes and rudder, guided so as to float gradually to the ground. If while in the air there should be any mishap, such as a stopping of the engine and a consequent loss of headway, the aviator would turn the two sets of upper planes so as to incline in opposite directions and slightly open the helicopters, and the machine would then become practically a parachute and settle gradually to earth without damage to itself or danger to the operator. Should it be desirable or necessary in maneuvering the machine to run on the ground the planes can be set horizontally and the helicopters folded flat, and if the propellers are not found to give sufficient propulsive effect the wheels can be connected by chains to the driving mechanism. Compared then with machines now in use, the aeromobile will be lighter and more compact, and promises the advantages of greater safety and stability, less dependence on the weather, or special or even particularly favorable places from which to start or at which to alight, and ability to travel on the land as well as in the air.

The Dodge Relief Association.

The Dodge Mutual Relief Association celebrated its twentieth anniversary July 31. This organization, made up of employees of the Dodge Mfg. Company, Mishawaka, Ind., is the oldest of its kind in Indiana. Its management is entirely in the hands of Dodge workers, and membership is voluntary. A complete executive force is maintained to look after membership, claims and other business.

The membership is divided into two classes: First, those whose weekly earnings exceed $6, for whom the weekly dues are 5 cents and the benefits 80 cents per day, Sundays and holidays excepted. Second, those whose earnings are less than $6 per week, for whom the weekly dues are 2½ cents and the daily benefits 40 cents. All benefits continue for a period of 13 weeks as a limit for any one term during 12 months dating from the first date of disability. In the event of death of a member of the first class, $50 is paid; of the second, $25. Cases of disability are investigated by a committee which makes a report to the Board of Directors. The fees are $1 for the first class and 50 cents for the second. The weekly dues are suspended when the funds on hand amount to $500 and resumed when they get as low as $300.

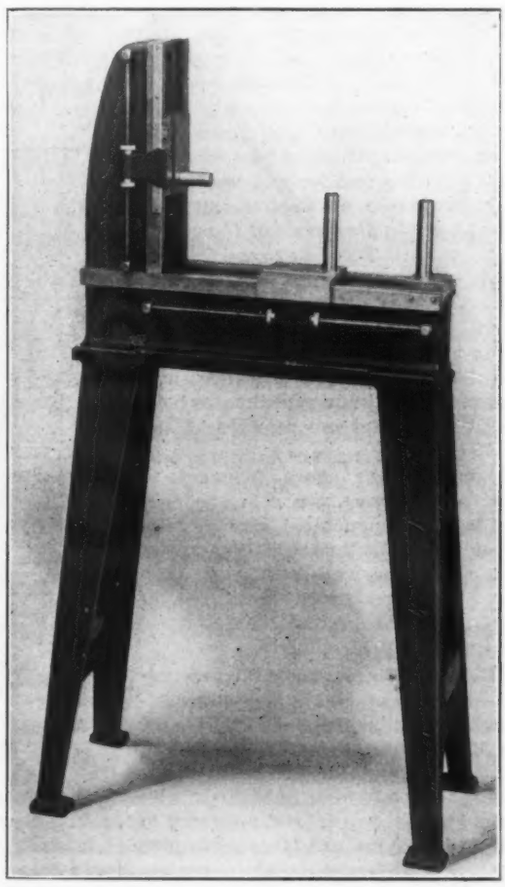
This association has proved a highly satisfactory method of mutual assistance in cases of misfortune, and the employees of the company generally approve its operation, the 2000 on the pay roll being members to a man. Charles Endlich, secretary and treasurer of the company, has served as treasurer of the association since its formation, July 31, 1889. Since that time over $15,000 has been disbursed in benefits, and a goodly sum is now on hand.

Virginia the Oldest Coal Producer.—The first bituminous coal mined in the United States, says the United States Geological Survey, was taken from what is usually termed the Richmond Basin, a small area in the southeastern portion of Virginia, near the city of Richmond. This basin is situated on the eastern margin of the Piedmont Plateau, 13 miles above tide water, on James River. It lies in Goochland, Henrico, Powhatan and Chesterfield counties. The coal beds are much distorted, and the coal is of rather low grade when compared with that from other districts with which it has to come into competition. The occurrence of coal was known in the Richmond Basin as early as 1700, and in 1789 shipments were made to some of the Northern States. In 1822, according to R. C. Taylor, the production amounted to 48,214 gross tons. At present what little coal is produced in this field is for local consumption only.

A New Gear-Testing Machine.

To insure a perfect bearing on both face and flank, giving smooth and noiseless operation, is the desideratum in gear testing. A machine designed to detect minute deviations is a recent product of the Cincinnati-Bickford Tool Company, Cincinnati, Ohio. It is adapted for testing both spur and bevel gears. The gears are mounted on removable studs held in adjustable slides, moving freely by hand in both horizontal and vertical directions and can be clamped at any point. A fine adjustment is provided on each slide by means of a screw and knurled nuts, and a vernier scale reading to thousandths of an inch gives correct center distances between studs. The cause of the slightest imperfections in the gear teeth can be analyzed by means of the device and the remedy applied to secure the desired perfect bearing and the absence of jar or other effect of improper meshing.

The shortest distance between centers of studs for spur gears is 2 in.; the greatest, 19½ in. This permits of the testing of a pair of gears 2-in. pitch diameter, representing the minimum of range and a pair 14-in. pitch diameter the maximum, or a combination set of 4 and 35 in. pitch diameters. The machine will take miter gears from the smallest up to 18 in. diameter, or a combination of bevel gears 4 and 32 in. diameter. Each machine is furnished with two studs 1 in. diameter and 4 in. long from the slide, and extra studs can be supplied as desired. The net weight of the machine is 325 lb. The floor space required is 16 x 34 in.



The Cincinnati-Bickford Tool Company's New Gear Testing Machine.

The W. R. Beatty Machinery & Equipment Company has leased two floors of a brick building, 40 x 50 ft., located at 30 Carson street, S. S., Pittsburgh. Some machinery, consisting of a gas engine and machine tools, is to be installed, which will enable general repair work to be undertaken. The site offers excellent shipping facilities, connections being available with most of the railroads entering Pittsburgh. The company will shortly remove from the House Building to its new quarters.

The Residual Brown Iron Ores of Cuba.*

An Estimated Total of 1,000,000,000 Tons in the Mayari, Moa, Cubitas and Baracoa Deposits.

BY C. M. WELD, NEW YORK.

Attention has been turned recently to the exploration and development of certain large blanket deposits of brown iron ore in Cuba. The most conspicuous of these to-day, and the one upon which the most light has been shed, is the Mayari deposit, situated about 15 miles south of Nipe Bay. Here the Spanish-American Iron Company has sole control over 18,500 acres of ore bearing lands, reported by its engineers to contain 500,000,000 tons of ore; and the necessary plant and equipment, with docks and railroads, is now under construction for the early marketing of this ore. A similar deposit, and undoubtedly the next to be exploited, is the ore field at Moa Bay, where 13,000 to 15,000 acres of ore lands immediately adjacent to the shores of an excellent harbor have been generously covered by numerous mining claims, practically all controlled by four large interests. This deposit is now estimated to contain approximately 350,000,000 tons, on the basis of dried ore ready for shipment, a figure which may be increased when the western limits of the ore deposit have been more accurately defined. Other deposits of the same type, but smaller and less accessible, are those at Cubitas, situated from 12 to 15 miles north of Camaguey City, and at Taco Bay and Navas, points lying a few miles west of Baracoa. The area of the Cubitas deposit is said to be 6000 acres and the yield of ore is estimated at 150,000,000 tons. The Baracoa deposits are less well known, but preliminary estimates have placed their joint ore reserves at 40,000,000 tons.

Accepting the above tonnages as reasonably correct, we conclude that the deposits enumerated give promise of adding about 1,000,000,000 tons of iron ore to the world's supply; they have, therefore, to be considered in any attempt to forecast the future of the iron and steel industries.

The map, Fig. 1, shows the approximate location of all the deposits mentioned. An illustrated description of the Mayari deposit, and the proposed plant and equipment for its exploitation, has already been published;[1] also additional information, together with brief reference to the Moa deposit.[2] These two papers are largely commercial in their attitude. A. C. Spencer, in his paper entitled "Three Deposits of Iron Ore in Cuba,"[3] gives valuable and interesting information along more purely scientific and technical lines regarding the deposits at Mayari, Moa and Cubitas. While the subject of the present paper is therefore not altogether new, it has appeared to me that certain features concerning the character and probable genesis of the iron ore deposits have not yet been brought out, and it is with this in view that the paper has been prepared.

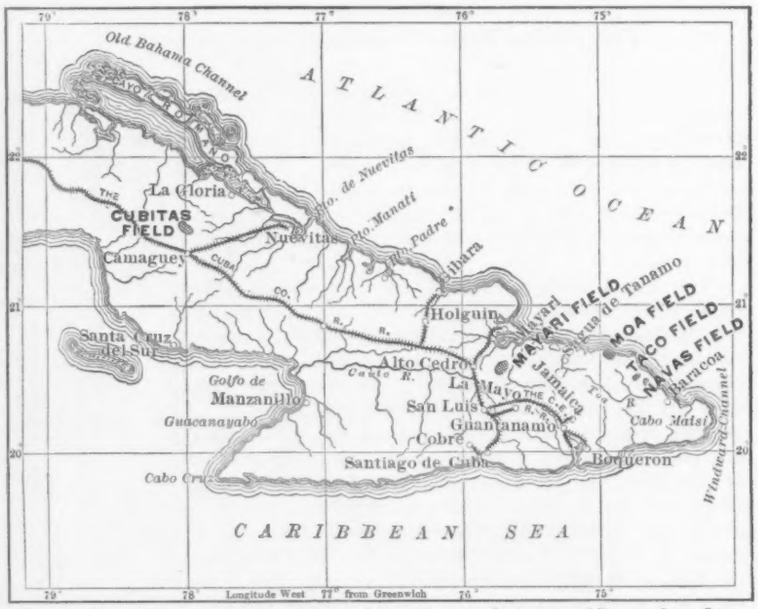


Fig. 1.—Map of Province of Santiago de Cuba, Showing Deposits of Brown Iron Ore.

General Characteristics.

The deposits under discussion possess essential characteristics in common. They occur as residual mantles of enormous surficial extent, with a thickness occasionally as great as from 50 to 60 ft., but more commonly varying from 10 to 20 ft. The underlying rock is serpentine. The ore, which extends from the grass roots to bed rock, is for the greater part a homogeneous, tenacious, clay-like material, red to yellow to brown in color. The transition between ore and the comparatively unaltered serpentine bed rock is as a rule fairly abrupt. Within the clay ore are found disseminated nodules and pellets of brown ore ranging apparently through all the hydrated forms from limonite to turgite. Hematite also is present and at times magnetite. These concretionary forms increase in abundance toward the top of the ore bed, where they frequently appear as recemented masses of spongy brown ore, occasionally of large dimensions, forming beds or layers within the clays. At many places a capping or crust, as it were, of recemented brown ore of considerable extent is found at the immediate surface. Fig. 2 represents an idealized section of the ore beds from grass roots to bed rock. This sketch has been constructed from numerous observations in the field and presents graphically the conditions above described.

Table I gives representative analyses from four different fields. That for Mayari is taken from the article cited above,[4] while the others are of samples taken in connection with private examinations and not before published:

Table I.—Analyses of Brown Iron Ores of Cuba.

	Mayari.	Moa.	Taco.	Navas
Fe	46.03	46.75	46.23	42.48
SiO_2	5.50	1.71	2.06	3.01
Al_2O_3	10.33	11.60	2.16	6.12
Cr	1.73	1.81	2.07	2.39
TiO_2	*a*	0.14	*a*	*a*
P	0.015	0.031	0.021	0.032
H_2O	13.62	13.15	*a*	*a*

a Element not reported.

These analyses represent the entire mass of ore; that is, the clay ore as well as the concretions and nodules. The figures are for the ores dried at 212 degrees F. The ore in the ground frequently contains in addition up to as high as from 30 to 35 per cent. of hygroscopic moisture.

The general similarity of these ores is at once apparent, the conspicuous features being low silica, high alumina and the presence of chromium in very appreciable amounts. These features are more especially true of the ores from Mayari and Moa, and it should be noted that the analyses given for those fields are the averages of a much greater number of samples than for the Taco and Navas fields; hence they should be regarded as more truly representative. In addition to the elements given above, nickel has been found in amounts of from 0.5 up to in some cases 2.0 per cent. Manganese is also present. The balance of the ore comprises small quantities of

* From a paper prepared for the New Haven meeting of the American Institute of Mining Engineers.

[1] *The Iron Age*, vol. lxxx., No. 7, pp. 421 to 426 (August 15, 1907).

[2] *The Iron Age*, vol. lxxxi., No. 15, pp. 1149 to 1157 (April 9, 1908).

[3] Bulletin No. 340, U. S. Geological Survey, pp. 318 to 329 (1908).

[4] *The Iron Age*, vol. lxxx., No. 7, p. 424 (August 15, 1907).

magnesia and lime, with probably traces of the alkalies and a very little sulphur.

The Moa Ores Typical.

Having established a common relationship between the ore beds of these various localities, the discussion in its bearing upon questions of genesis will henceforth be more particularly confined to the ores at Moa, since my opportunities for personal observation have been confined to that field. The Moa occurrence, moreover, as will appear later, approaches more nearly to a model type; at the same time, it will be seen that conclusions based on the Moa occurrence are equally applicable in their general aspects to the other occurrences. Before leaving the question of common relationship it may be well to review briefly the points from which this has been deduced, which are: 1, The blanket or mantle form of all the ore beds; 2, the common bed rock of serpentine; 3. the common appearance and nature—namely, ocherous clay-like materials carrying disseminated nodules and masses of brown ores; and, 4, the common analysis, showing low silica and high alumina, with notable quantities of chromium and much combined water.

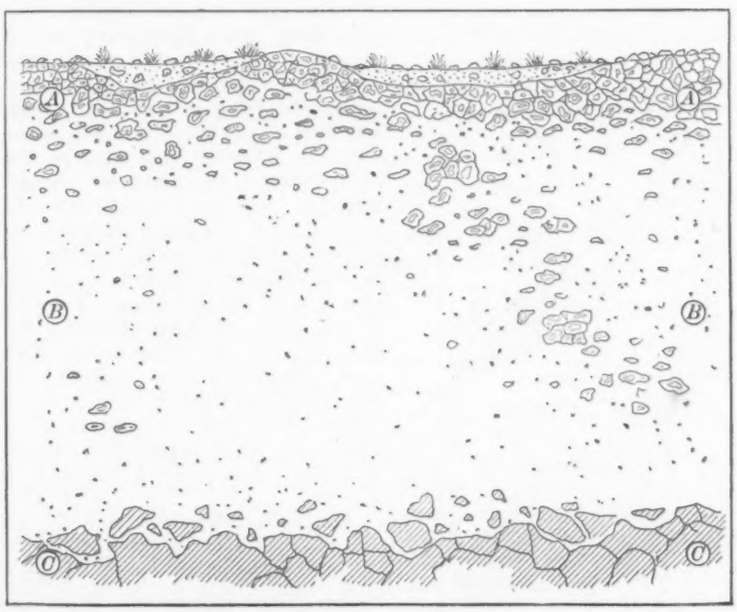


Fig. 2.—Idealized Vertical Section Showing Nature of Occurrence of Residual Iron Ore in Cuba.

A. Recemented capping of brown ore, from 1 or 2 up to 10 ft. thick. Frequently absent.

B. Clay ore, red, yellow or brown in color, from 7 or 8 up to 50 or 60 ft. thick. Contains disseminated nodules and pellets of brown ore, at times agglomerated in the form of beds or layers.

C. Serpentine bed rock.

The map, Fig. 3, shows the general features of the Moa deposit. The ore bed occupies practically the entire area adjacent to the shore, and extends thence inland for a distance of from 3 to 5 miles, finally fingering out along the crests of the divides. Wherever the ore comes to an end laterally and where it has been cut through by streams serpentine is found as the country rock. A number of samples of this serpentine were taken, of which an average analysis is given in Table II, together with a reconstructed complete analysis of the ore:

Table II.—Analyses of Country Rock and Iron Ore, Moa Bay, Cuba.

	Serpentine. Per cent.	Iron ore. Per cent.
Fe_2O_3	...	66.90
FeO	8.55	...
SiO_2	37.29	1.71
Al_2O_3	1.33	11.60
TiO_2		0.14
Cr_2O_3	0.28*a*	2.65
NiO		0.60
P_2O_5	0.07	0.07
MnO	Trace.	0.80
CaO	0.29	
MgO	36.53	*a*2.38
K_2O	Trace	
Na_2O	0.39	
H_2O	15.27	12.15
Totals	100.00	100.00

a Calculated by difference.

The ores have already been described as "residual mantles," the inference being that they have been derived from the underlying rocks by processes of subaërial decay. Any other theory of origin involves transportation.

The theory that they are derived directly from the serpentine is supported by the analyses in Table II. The ore is, in fact, a laterite, a product due to the peculiar form of decomposition known as laterization, which is common to humid tropical climates. The essential characteristic of laterization is the breaking up of the silicates, with the ultimate almost complete removal of the silica, wherein it differs radically from the kaolinization processes of the temperate zones. Laterites have been reported from many tropical localities and are especially common in India.

The ordinary procedure in rock decay involves the removal of lime, magnesia and the alkalies, while the aluminous silicates and the ferric oxides for the greater part remain behind. Laterization goes one step further and removes the silica as well. Its characteristics are: 1, the liberation of the silica from its various compounds; 2, the removal by solution of the lime and magnesia; 3, the oxidation of the ferrous to ferric iron; 4, the removal of the silica and the alkalies; 5, the concentration, as a residual mantle, of the alumina and ferric iron, with titania, chromic oxide and other impurities; and 6, a sort of secondary dehydration leading to concretionary and pisolitic recemented masses, more or less abundantly disseminated through the mantle.

With this process in mind, the serpentine may be readily recognized as the parent of the iron ore. Lime, magnesia, silica and the alkalies have been largely if not wholly removed, and the iron and alumina have been concentrated. There is seven times as much iron in the ore as in the serpentine, and eight and one-half times as much alumina. About the same ratio appears to hold with the chormium, nickel and titanium, which are nearly equally persistent with the iron and alumina. In short, there is no need to appeal to a hypothetical foreign source for any of the elements constituting the ore, either in whole or in part. No supposition involving transportation of material is required. Everything is at hand and the history of the ore as residual material derived directly from its underlying rock is complete.

History of the Moa Deposits.

We may now turn from the question of genesis to a consideration of the probable age and history of the Moa type of brown ore deposits. In this connection I wish to acknowledge my indebtedness to A. C. Spencer for suggestions taken not only from his publication but also from verbal discussions. The Cubitas, Mayari, Navas and Taco deposits all occupy plateaus. Mr. Spencer says of the Cubitas in his paper, "Three Deposits of Iron Ore in Cuba," already referred to:

> Within an area measuring roughly 10 miles east and west and 4 miles north and south, there are several flat-topped mesas rising 300 to 400 ft. above the general level of an almost featureless plain. . . . The ore deposits are all surface mantles covering the plateau-like mesas.

The actual elevation of the mesas above sea level is not given. The following description of the Mayari deposit has also been published:[2]

> The ore body is on the summit of a gently rolling plateau, roughly ten miles long and 4 miles wide, with its principal axis lying northeast and southwest. Its elevation is about 1600 ft. at the northwestern extremity, which is nearest to Nipe Bay, and it rises toward the southwest to an elevation of 2200 to 2300 ft., with one peak reaching to 2600 ft. and another to 3200 ft.

The Taco deposit occupies a partly dissected plateau.

[2] *The Iron Age*, vol. lxxx., No. 7, p. 421 (August 15, 1907).

approximately 4 miles long by 1.5 miles wide, with the longer axis, NE.—SW., at a general elevation of 2100 ft. above sea level. The Navas plateau, extending 2.5 miles N.—S. and 1.25 miles wide, is from 1600 to 1800 ft. above sea level.

At Moa the conditions are different. The ore mantle, adjacent to tidewater and extending thence inland for a distance of from 3 to 5 miles, lies on a surface exhibiting no very pronounced relief, the average grade shoreward being about 250 ft. to the mile. The final disappearance of the ore mantle inland is obviously due to the usual processes of surface denudation. The underlying serpentine first appears in the stream beds, which may be wholly in bed rock, with the ore still persisting on the inter-stream divides. Thus, the upper edge of the ore body presents a series of fingers persisting upward along the crests of the divides till it finally disappears on the divides as well as in the stream bottoms.

There can be little doubt that the Moa type of ores was originally formed on an ancient peneplain, and probably occupied at that time vastly greater areas than to-day. The present plateaus are remnants of the ancient peneplain and owe their elevated position to a period of uplift, accompanied by a certain amount of warping, fracturing and probably partial subsidence. The plateau deposits underwent more or less simple vertical uplift. The Moa area was tilted and possibly fractured, subsiding once more to somewhere near its present position and level. The peneplain period may perhaps be referred to the Upper Oligocene, since at that time, according to Hayes, Vaughan and Spencer,[6] nearly the whole island of Cuba was submerged, excepting portions along the north and south shores of Santiago Province. The next succeeding (Miocene) period was one of general uplift. Quoting from the report of the above:

> There was folding and uplift during this period, the elevation along the axial line being greater than at the sides. . . . One could infer that the central portion of the Province of Santiago was more highly elevated than the coastal portion, since Upper Oligocene limestones occur in the central portion of that province at considerably higher elevations than along either the north or the south coast.

This last statement probably explains the tilting of the Mayari plateau toward the north, and also the tilting and possibly the breaking off and resulting partial subsidence of the Moa block.

[6] Report on a Geological Reconnoissance of Cuba, included in Civil Report of Brig.-Gen. Leonard Wood, Military Governor of Cuba, vol. I., pp. 31 to 34 (1901).

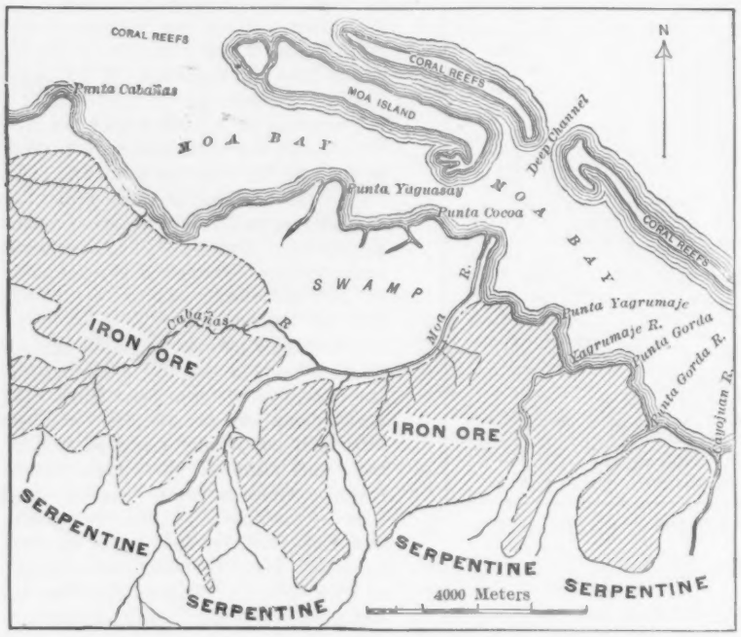


Fig. 3.—Sketch Map of the Moa Iron Ore Field, Santiago Province, Cuba.

The cross-hatched area indicates approximately that occupied by iron ore. The western extremity of the deposit is not shown, but has been taken into account in estimating the tonnage of ore offered by the field.

The uplift was followed by a rejuvenation of the streams and renewed denudation activity. The ancient peneplain was dissected and cut back until there was left only the present remnants, still carrying their original mantles of ore; and even these are in a geological sense still rapidly disappearing. The upper portion of the Moa block has been planed off, while the lower portion owes its preservation to the fact that it lies so near sea level that the stream gradients have practically disappeared and their power to dissect and remove has been reduced to a minimum.

New Ores Forming To-Day.

Thus the original development of the Moa type of ores should probably be referred to pre-Miocene times. During and since the period of uplift, vast quantities of these ores have undoubtedly been mechanically removed and dissipated. At the same time there is no reason to suppose that laterization processes have ceased; it is, in fact, probable that new ores are forming to-day wherever opportunity offers. Such opportunity may be regarded as at a minimum on the plateaus, where heavy mantles of material lying nearly horizontal effectively protect the underlying rock from the action of surface waters. Wherever the stream beds have dissected the plateaus, however, revealing fresh areas of serpentine and inducing new and lower curves in the adjacent ground water levels, the growth of laterite must be proceeding as it did in former times. The presence of numerous sinks appears to furnish evidence to support this statement. Thus the descent of the lateritic zone must be keeping pace with the degradation of the land surface, except where this is so rapid that products of decay are removed as soon as formed.

We infer, then, that there are two limits to the accumulation of laterite. On the one hand, too great an opportunity, which has led to its development on an undisturbed peneplain up to a point where the underlying rock is pretty well protected—in this case the decay will no doubt continue to proceed downward, but at a greatly reduced rate; and, on the other hand, too little opportunity, through its removal mechanically as fast as it forms. The first limit may have been the condition of affairs at the close of the Upper Oligocene, when huge mantles of laterite had accumulated to about their maximum depth. The second limit is that of to-day, except where locally intermediate sets of conditions may exist. At such points the ore beds are undoubtedly increasing. On the whole, however, since the beginning of Miocene times the probabilities are that very much greater quantities of the lateritic ores have been destroyed than have been formed.

The Moa deposit differs from the others chemically in being a more perfect type of laterization, and structurally in not occupying a plateau. It would appear that the deposit was originally a portion of a great peneplain, upon which was accumulated a thick mantle of ore through processes of subaerial decay common to humid tropical climates. At the time of the general uplift the Moa block apparently broke off and partly subsided once more, tilting toward the north. Renewed denudation then planed off the upper edges of the block, removing the ore mantle and cutting down into the underlying rock. Any further ore forming at the higher levels was removed as fast as it formed. Lower down, however, transportation was at its minimum, and the ore already existing not only remained undisturbed, but probably increased somewhat in depth. Furthermore, through saturation by surface waters, the process of laterization was advanced nearly to theoretical completeness, and

at the lower levels, representing the heart of this great ore field, there are occasionally found mantles of ore exceeding 60 ft. in thickness, containing a minimum of silica.

No Evidence of Transport of Ore Material.

The structural history of this field may raise the question, Why attribute the accumulations of ore entirely to decay in place? Was there not exceptional opportunity here for mechanical transport or transport in solution with secondary concentration? The answer is the absolute absence of evidence or appearance of such accumulation through transport of material. The ores as found are satisfactorily accounted for in their entirety by the decay of the underlying rock. The analyses of many samples, representing in a most thorough manner wide areas, are remarkably uniform, although many were taken from localities where opportunity for secondary concentration or accumulation would be much better than at other localities. In the absence of any evidence to the contrary, the conclusion must be that the ore bearing materials which have been removed from the upper levels were simply dissipated by the waters removing them. They do not appear to have contributed to the ores of the lower levels, either by increasing the bulk of the accumulation or by any process of enrichment.

Similar questions of possible transport of material cannot be raised by the structural conditions attendant upon the other fields. Hence the theory of development of ore in place through laterization processes offers the only ready and entirely satisfactory explanation for the ore deposits in those fields; and that the laterization has not been as perfect as at Moa may be due to any number of readily suggested causes.

Cuban Ores for Seaboard Furnaces.

The development of these huge fields of iron ore in Cuba has directed study upon several metallurgical problems attending their use in the manufacture of iron and steel, chiefly in connection with the high alumina and chromium contents. Exhaustive studies and experiments on Mayari ores have been carried out within the last few years by the Pennsylvania Steel Company, and it has been announced that all the difficulties have been solved, and steel rails of more than usual excellence have been manufactured from these ores. It is not within the scope of this paper to go into metallurgical details. I merely refer to this feature and its happy solution in a congratulatory frame of mind. The cheapness with which the ore can be extracted must have presented itself to any one of mining experience. The high moisture content, hygroscopic plus combined, together with the clayey structure, makes it very desirable to treat the ore before shipping by some agglomerating process under fairly high temperatures. With the former difficulties attending the presence of high alumina and high chromium removed the agglomerated or nodulized ore, practically free from moisture and in that condition carrying more than 50 per cent. of metallic iron, will undoubtedly find a ready market on the Atlantic seaboard, and in all probability new plants will be erected on the seaboard to profit by this opportunity.

The Gardner Under-Belted Disk Grinder Drive

An arrangement for driving a disk grinder, which is regarded by the company offering it, the Gardner Machine Company, Beloit, Wis., as an improvement over a direct motor drive is shown in the illustrations. Where the armature shaft of the motor serves as the spindle of the machine, there is the difficulty of preventing the infiltration of dust into the working parts of the motor. Moreover the end play of the armature shaft required for magnetic balance makes it difficult to accomplish extremely accurate grinding.

Fig. 1 shows the application of an under belt drive to one of the company's No. 12 plain disk grinders, and Fig. 2, sectional elevations showing the placing of the belt. The machine itself is the same as the one described in *The Iron Age*, July 2, 1908, with a slight modification in the frame, so that the belt can be passed over the machine spindle pulley and down through the base of the machine and through the floor to a motor mounted on the ceiling below or in the pedestal of the machine. The spindle pulley and belt are entirely inclosed, which is an advantage over an overhead belt driven arrangement, and the whole machine offers a compact and efficient substitute for the direct motor driven disk grinder. The under

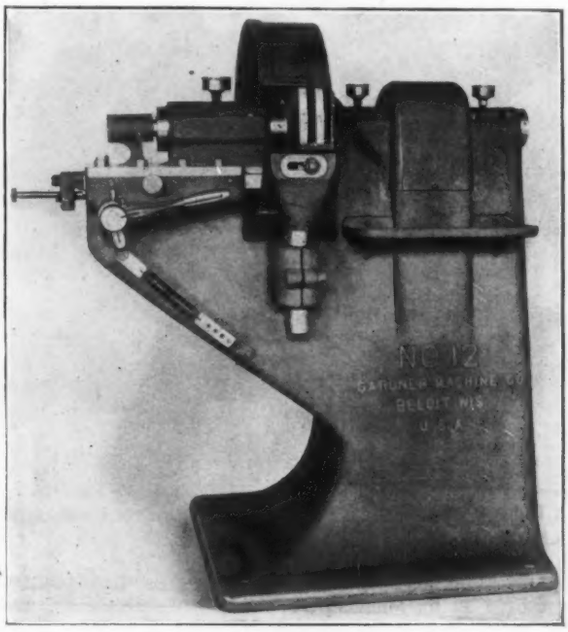


Fig. 1.—The No. 12 Plain Disk Grinder with Under-Belted Drive, Built by the Gardner Machine Company, Beloit, Wis.

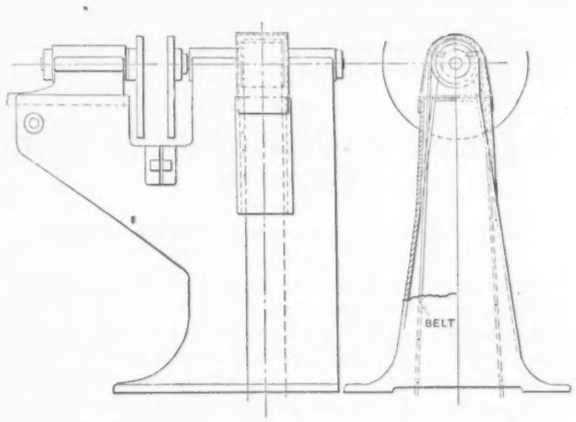


Fig. 2.—Side Elevation and Cross Section, Showing the Under-Belted Driving Arrangement.

belt drive can be furnished with any of the other styles and sizes of Gardner's improved disk grinders.

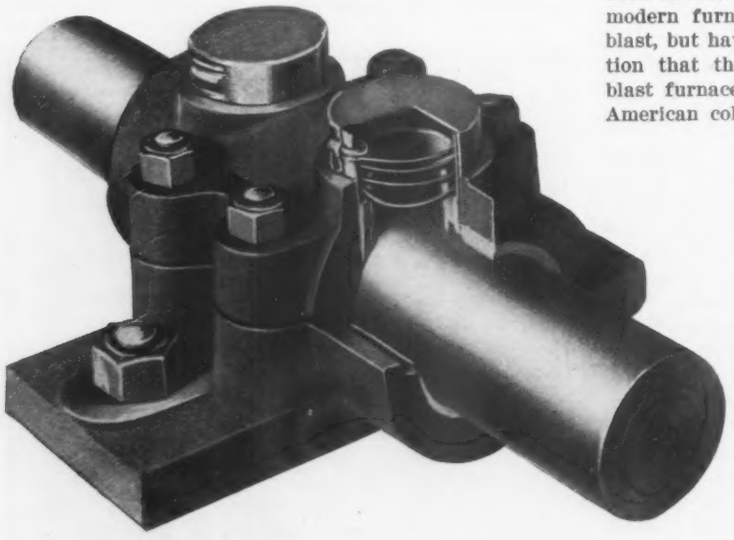
The Van Doren Lubricator.

The lubricating device illustrated is a recent product of the C. J. Van Doren Company, 5 West Madison street, Chicago. The advantages claimed for it are that it applies the lubricant to the journal evenly and in minute quantities so regulated as to supply a constant film of grease between the shaft and bearings; also that it is absolutely dust proof and free from drip with its resultant filth and fire hazard.

The device is extremely simple, consisting of but four parts, which include the cap, containing barrel, tension spring and a wood gland. The function of the wood gland, which fits inside of the barrel with its lower end conforming to the curvature of the shaft, is to keep the shaft wiped clean of surplus grease, allowing just enough of it to pass to give perfect lubrication. This gland is completely filled with grease, which lies upon the surface of the shaft, and its bottom edge is covered with felt to prevent undue friction from the wood. Its bearing

against the shaft is evenly maintained by the spring.

In applying the lubricator a hole is drilled in the bearing cap to snugly fit the lubricator barrel, which is fastened in place by pricking with an off-set center



A Pedestal Bearing Equipped with the Lubricators Made by the C. J. Van Doren Company, Chicago.

punch. For ordinary bearings under 4 in. diameter and not over 12 in. long two lubricators are necessary, and for large sizes or for extra heavy duty more may be required, according to sizes and conditions. The only machine work necessary to install this lubricator is the drilling of the hole in the bearing cap to receive it. It is made in three sizes, No. 1 for shafts 1 11-16 in. and smaller, No. 2 for shafts 1 11-16 in. to 2 11-16 in. and No. 3 for 2 11-16 in. and larger.

The Rate of Combustion in Blast Furnaces.

BY PROF. M. A. PAVLOFF, ST. PETERSBURG, RUSSIA.

It is an axiom of modern blast furnace practice that the section of the hearth at the tuyere level must be in proportion to the amount of air blown into the furnace; that is to say, the hearth diameter must be founded on the requisite rate of combustion. But in the most authoritative treatises on metallurgy and, also, in articles in current technical journals, specially dealing with the dimensions and shape of blast furnaces, nothing but very meager information can be found on the subject. The author of the description of the Gary plant printed in the first issue for 1909 of the *Iron Trade Review* finds that Gary blast furnaces have hearth capacity for the production of 530 tons daily, assuming a consumption of 2200 lb. of coke per ton of iron made and 6000 lb. per square foot of hearth area. The late Robert Forsythe in his book, "The Blast Furnace and the Manufacture of Pig Iron," states that coke blast furnaces consume daily from 5000 to 7000 lb. of coke per square foot of hearth section at the tuyere level. This statement is evidently based on American practice solely. Taking into consideration the results of operation of many American blast furnaces and European practice with the largest furnaces assigned on modern lines, the author of this article holds the opinion that 7000 lb. is a very high figure for the normal rate of combustion of any furnace, and, as concerns the Gary blast furnaces, they may be rated, in accordance with their sizes, as 475-ton stacks, thus showing the rate of combustion equal to 537 lb. per square foot, assuming that normal fuel consumption equals 2000 lb. per ton of iron.

With regard to charcoal blast furnace practice, in Forsythe's book we meet with the following statement: "Charcoal, because of the large surface which it presents to the blast, permits a more rapid rate of combustion than coke, and hence a higher duty per square foot of hearth area." This quite disagrees with actual practice. The "higher duty" claimed never has been shown neither by the old fashioned blast furnaces, with their narrow hearths and very slow smelting, nor by the modern furnaces, receiving a much greater amount of blast, but having their hearth enlarged in such a proportion that the average rate of combustion in charcoal blast furnaces now in operation is half the average of American coke blast furnaces. But a number of small, yet well working (as regards fuel consumption) Swedish blast furnaces making pig iron to be worked with charcoal fuel show a rate of combustion as low as 1500 lb. per square foot. On the other hand, American charcoal blast furnaces of the largest output ever recorded consume up to 5200 lb. of charcoal per square foot of hearth area. An intermediate position is taken by the Russian charcoal blast furnaces, as may be seen from table I given herewith, in which the general conditions and results of operation of 40 blast furnaces in various iron making localities in Europe and America are presented for purposes of reference.

In coke blast furnaces the rate of combustion generally varies from 6000 to 4000 lb. of coke consumed daily per square foot of hearth area. Extreme figures of the table are 6550 and 3420, the first of which relates to a 500-ton American furnace running on standard Bessemer iron, and the second to a German furnace devoted to producing basic Bessemer iron exclusively by treating very lean but self-fluxing minette ore (brown hematite).

Table I clearly shows that the rate of combustion can in no way remain the same under different conditions of operation, and to this fact the attention of a designer must be drawn in deciding on the hearth diameter. First, the daily make and kind of fuel to be used must be taken into consideration, and table II may be recommended by the author for purposes of necessary information. Mention may also be made that a coke abnormally high in sulphur—as, for instance, South Russian coke, which often contains more than 1½ per cent. of sulphur—requires very limey slags, narrower hearths, and, consequently, a higher rate of combustion than coke low in sulphur. Second, the kind of ore to be smelted and of iron to be made must be considered as factors of importance, and the higher values shown in each line of the table should be taken when dealing with the treatment of ores hard to reduce or with the producing of very hot iron—that is, high in silicon or manganese.

Table II.—Showing the Normal Rate of Combustion in Pounds of Coke Consumed Daily Per Square Foot of Hearth Area.

From 6550 to 5350 lb., in the largest blast furnaces of more than 450 tons capacity; the maximum relates to the American furnaces.

From 5350 to 4570 lb., in coke blast furnaces of 450 to 250 tons capacity.

From 4570 to 3860 lb., in ordinary European coke blast furnaces of 250 to 150 tons capacity.

From 3860 to 3300 lb., in small coke blast furnaces of less than 150 tons capacity and the largest charcoal blast furnaces of more than 70 tons capacity.

From 3300 to 2850 lb., in ordinary charcoal blast furnaces of 70 to 23 tons capacity.

If, on the contrary, nothing but basic Bessemer iron, very low in silicon, is intended to be manufactured in a given blast furnace, the corresponding figures for the rate of combustion must be reduced from 400 to 600 lb. Such a decrease is needed also when we are dealing with the lean argillaceous ores predisposed to the production of iron high in silicon.

Considering that the relative consumption of fuel may be closely approximated in each special case (should it not be given), the above table may be used also to find the average daily make corresponding with the given furnace hearth, which further enables the convenient cubic contents of a furnace to be found in order to bring the rate of combustion in suitable proportion to the rate of smelting.

Table I.—Showing General Conditions of Working and the Rate of Combustion of 40 Modern Blast Furnaces.

	Names and location of blast furnaces.	Furnace sizes.—Available hight from hearth to stock line. Ft.	In.	Available volume hearth level to stock line. Cu. ft.	Hearth diameter at the level of tuyere center line. Ft.	In.	Hearth area Sq. ft.	Results of operating—Daily output of iron. Tons.	Per square foot of hearth area.	Fuel consumption per unit of iron.	Rate of combustion in pounds of fuel per sq. ft. of hearth area.	Intensity of driving in cubic feet of available volume per ton of daily output.	Kind of ores used and iron contents in ore mixture.
	Charcoal Blast Furnaces.												
1.	Herräng, Sweden	48	..	2,681	5	9	26	25	0.96	0.70	1,508	107	Roasted briquettes of magnetite concentrates, yielding 63 per cent.
2.	Boxholm, Sweden	49	8	2,740	5	2	21	22	1.05	0.74	1,737	125	Roasted magnetite, yielding 60 per cent. of iron.
3.	Karmansbo, Sweden	54	..	3,175	6	8	34.9	40	1.15	0.90	2,311	79	Roasted magnetite, yielding 50 per cent. of iron.
4.	Nadejdinskaia, Ural, Russia	56	..	4,890	7	..	38.5	45	1.17	1.00	2,618	109	Mixed magnetite, red hematite and brown hematite, yielding 56.7 per cent.
5.	Verkne-Turinskaia, Ural, Russia	44	7	3,885	5	9½	26.4	38	1.44	0.83	2,676	102	Magnetite of the Blagodat Mountain (raw and unroasted), yield. 59.5 p. c.
6.	Ernolovskaia, Ural, Russia	55	4	5,176	6	9	35.8	54	1.51	0.836	2,824	96	Bakal spathic ore and brown hematite, roasted, yielding 58.5 per cent.
7.	Kooshvinskaia, Ural, Russia	50	3	3,616	5	6	23.8	30	1.25	1.02	2,880	121	Raw and roasted magnetite of the Blagadat Mountain, yielding 58.6 per ct.
8.	Nijni-Saldinskaia, Ural, Russia	52	..	4,025	4	11	19	26	1.37	1.00	3,065	155	Roasted magnetite of the Visokaia Mountain, yielding 62 per cent.
9.	Vares, Bosnia, Austria	54	7	6,150	8	2½	52.9	100	1.90	0.85	3,600	61.5	Local red and brown hematites, yielding 53 per cent.
10.	Rock Run, Alabama, U. S. A.	47	4	2,841	6	6	33.2	60	1.81	0.90	3,644	47	Alabama brown hematites, yielding 48 per cent.
11.	Antrim, Michigan, U. S. A.	51	9	3,427	6	6	33.2	94	2.83	0.81	5,137	36	Lake Superior red hematites, yielding 51 per cent.
12	Hinkle, Wisconsin, U. S. A.	54	..	3,500	7	1	39.4	121	3.07	0.76	5,227	28.9	Lake Superior red hematites, yielding 54 per cent.
	Coke Blast Furnaces.												
	(*a*) Making Basic Bessemer Iron.												
13.	Differdingen, Lorrain, Germany	68	7	16,500	11	6	103.5	175	1.70	1.10	4,100	94	Lorrain self-fluxing brown hematite (minette), yielding 30 per cent.
14.	Kerchenskaia, Kerch, Russia	76	..	17,650	11	6	103.5	175	1.7	1.10	4,100	101	Kerch brown hematite, yielding from 40 to 42 per cent.
15.	Gutehoffnungshütte, Westph., Germ.	60	4	12,360	11	6	103.5	180	1.74	1.10	4,220	77	Various kinds of ores mixed, yielding in mixture 48 per cent.
16.	Rombacherhütte, Lorrain, Germany	79	..	20,600	13	1½	135.3	200	1.48	1.05	3,420	103	Lorrain self-fluxing brown hematite (minette), yielding 32 per cent.
17.	Hoerde, Westphalia, Germany	62	4	16,250	13	1½	135.3	250	1.85	1.05	4,280	65	Various kinds of ores mixed, yielding from 43 to 45 per cent.
18.	Reinischestahlwerke, Rhein Prov., Ger.	86	..	19,500	13	9½	149	320	2.15	1.00	4,735	61	Various kinds of ores mixed, yielding about 52 per cent.
19.	Deutscher Kaiser, Brukhaus., Germ.	74	6	20,300	14	9	170.9	450	2.63	1.00	5,800	45	Various kinds of ores mixed, yielding about 45 per cent.
	(*b*) Making Basic Open Hearth Iron.												
20.	Vanderbilt No. 1, Alabama, U. S. A.	71	..	13,600	12	..	113.1	250	2.21	1.3	6,437	54.4	Alabama red and brown hematite, yielding in mixture from 40 to 42 per ct.
21.	Donawitz No. 2, Austria	60	..	13,600	11	10	109.6	260	2.4	0.9	4,710	52	Erzberg spathic ore (raw and roasted), yielding about 50 per cent.
22.	Ensley No. 4, Alabama, U. S. A.	76	2	19,100	14	6	165.13	360	2.2	1.22	5,960	53	Alabama red and brown hematites, yielding about 41 per cent.
23.	Alexandrovskaia No. 5, South Russia.	78	3½	19,800	13	1½	135.3	400	2.96	0.90	5,866	49.5	Krivoi Rog red hematites, yielding about 59 per cent.
24.	Witkowitz No. 5, Austria-Silesia	73	2	19,600	13	1½	135.3	400	2.96	0.90	5,866	49	Vlungar brown hematites, mixed with Swedish magnet., yielding 50 per cent.
25.	Eisenerz, Styr., Austria	88	11	22,800	13	9½	149	450	3.00	0.85	5,660	51	Erzberg spathic ore (½ raw and ½ roasted), yielding 50 per cent.
26.	Gary, U. S. A.	81	..	21,200	15	..	176.72	475	2.70	0.90	5,420	44.6	Lake Superior hematites, yielding from 52 to 56 per cent.
	(*c*) Making Standard Bessemer Iron.												
27.	Blaenavon No. 6, England	67	3	12,500	10	..	78.54	175	2.23	0.86	4,290	71	Spanish brown hematites and calc. carbonates, yielding about 50.5 per cent.
28.	Seraing (Cockerill), Belgium	69	..	15,200	11	6	103.5	200	1.93	1.10	4,690	76	Spanish brown hematites and calc. carbonates, yielding about 50.5 per cent.
29.	Alexandrovskaia No. 4, South Russia.	71	2	15,000	11	10	109.6	250	2.30	0.97	4,880	60	Krivoi Rog red hematites, yielding about 59 per cent.
30.	Kramatorskaia No. 2, South Russia.	82	..	19,200	12	9½	128.5	300	2.33	1.00	5,150	64	Krivoi Rog red hematites, yielding about 58 per cent.
31.	Sharpsville, Pennsylvania, U. S. A.	69	6	14,100	12	6	122.72	350	2.85	1.00	6,390	40	Mesaba ores exclusively, yielding about 52 per cent.
32.	Isabella, Pennsylvania, U. S. A.	80	..	18,000	13	6	143.14	425	2.97	0.95	6,317	42	Lake Superior hematites, yielding about 57 per cent.
33	Edgar Thomson, Penn., U. S. A.	81	..	21,400	14	..	153.94	500	3.25	0.90	6,550	43	Lake Superior hematites, yielding about 57 per cent.
	(*d*) Making Foundry Iron.												
34.	Alexandrovskaia No. 1, South Russia.	59	..	10,240	11	2	97.73	160	1.62	1.23	4,440	64	Krivoi Rog red hematites, yielding about 58 per cent.
35.	Warwick No. 2, Pennsylvania, U. S. A.	62	2	7,800	10	6	86.59	175	2.00	1.15	5,200	44½	½ magnetites and ½ Lake Superior hematites, yielding about 57 per cent.
36.	Clarence No. 11, England	69	..	18,000	12	..	113.1	180	1.60	1.13	4,030	100	Calcined Cleveland ironstone, yielding about 40 per cent.
37.	Pioneer, Alabama, U. S. A.	77	..	15,230	12	6	122.72	210	1.71	1.40	5,366	72½	Alabama red and brown hematites, yielding from 40 to 42 per cent.
38.	Yurievskaia No. 3, South Russia	65	7	14,400	11	6	103.5	225	2.17	1.10	5,272	64	Krivoi Rog red hematites, yielding 58 per cent.
39.	Mayville B, Mayville, U. S. A.	68	7	10,500	11	..	95.03	240	2.50	1.00	5,657	44	Lake Superior red hematites and local brown hematites, yielding 48 per ct.
40.	Thomas No. 1, Pennsylvania, U. S. A.	73	..	13,300	11	7	105.5	250	2.37	1.15	6,100	53	½ magnetites and ½ Lake Superior hematites, yielding 58 per cent.

Ferracute Can-Soldering Machines.

Several special machines for soldering the ends and sides of square cans, such as are used for exporting oil, were recently shipped to Japan by the Ferracute Machine Company, Bridgeton, N. J. Included in the shipment were several acid brushing machines. The bodies of cans of the kind mentioned are composed of two sheets of tin joined with the two seams at the diagonally opposite edges. These seams are made by forming, hooking together and mashing down the edges of the tin, after which the seams must be soldered. The tops and bottoms are crimped to the bodies, the upper and lower edges of which have been previously brushed with dilute acid. The edges of the cans are then dipped in melted solder, thereby making an oil tight joint.

Fig. 1 shows a machine for soldering the side seams. It comprises an elongated frame or table supporting a double trough containing melted solder which is kept hot by a double row of gas burners under each trough. Guide rods extend along the sides of the troughs, so placed that a can body resting upon them will have one of its edge seams submerged in the solder. The bodies are moved along the guides by a link belt or chain having projecting lugs spaced slightly more than the length of a body apart. A sprocket wheel set-screwed to a cross shaft at the end of the machine drives the chain. There is an additional sprocket wheel on each shaft that acts as a follower, running loose on the shaft. The shafts run in opposite directions, thereby causing the bodies to travel through the two solder troughs in opposite directions. The unsoldered bodies are fed into the machine at one end, and when they reach the opposite end they are reversed and returned through the other trough, which solders the other seam, after which they slide down a chute out of the way. The capacity of the machine is about 90 side seams per minute.

Fig. 2 shows a machine for brushing acid on the upper and lower edges of the body. There are four brushes, one for each side of the edge, all having the same motion, which is the same as would naturally be given if the brushing were being done by hand. The action is rapid, the four edges being brushed in an instant, or as fast as the operator can set a body on the table and remove it.

The can dipping machine, front and rear views of which are shown in Fig. 3, is another of interesting construction. This machine holds two cans at a time over a pan of melted solder, automatically dips the cans so their edges will just touch the solder; raises the cans, and when clear of the solder rotates each can 90 degrees and again dips, repeating the operation until the four edges are soldered, after which a corner is dipped to remove the drop of melted solder hanging from it. The cans are again raised, partially rotated and mechanically ejected from the machine, dropping on a vertically moving balanced shelf that takes them out of the way.

The flywheel runs loose on its shaft until the treadle is depressed, which action causes the clutch to lock the wheel to the shaft. Motion is then communicated by the shaft to the grooved drum and the cam forming a part of it. The cam raises and lowers the rocker containing the cans, while the grooves guide a shuttle arm, the result being an intermittent horizontal motion of the rock

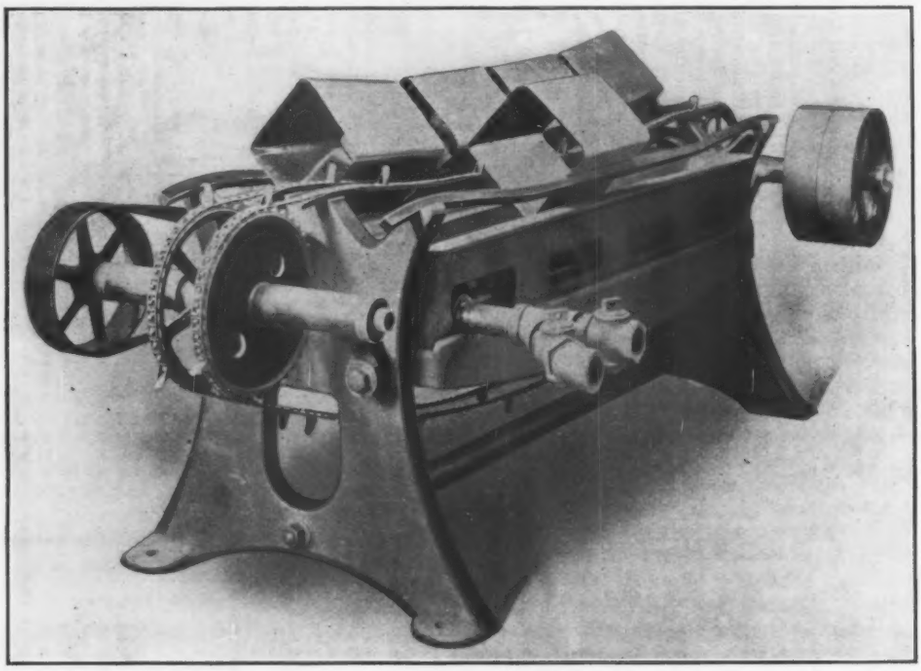


Fig. 1.—A Machine for Soldering the Longitudinal Seams of Can Bodies, Built by the Ferracute Machine Company, Bridgeton, N. J.

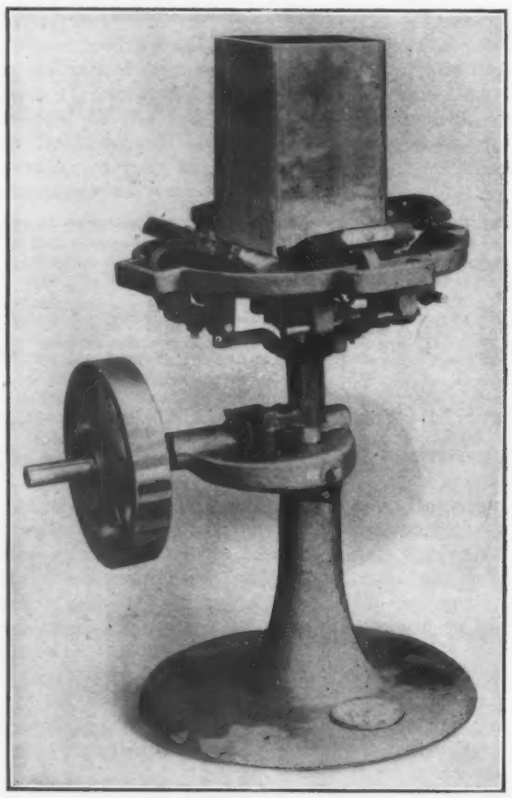


Fig. 2.—A Machine for Brushing Acid on the Top and Bottom Seams of Cans.

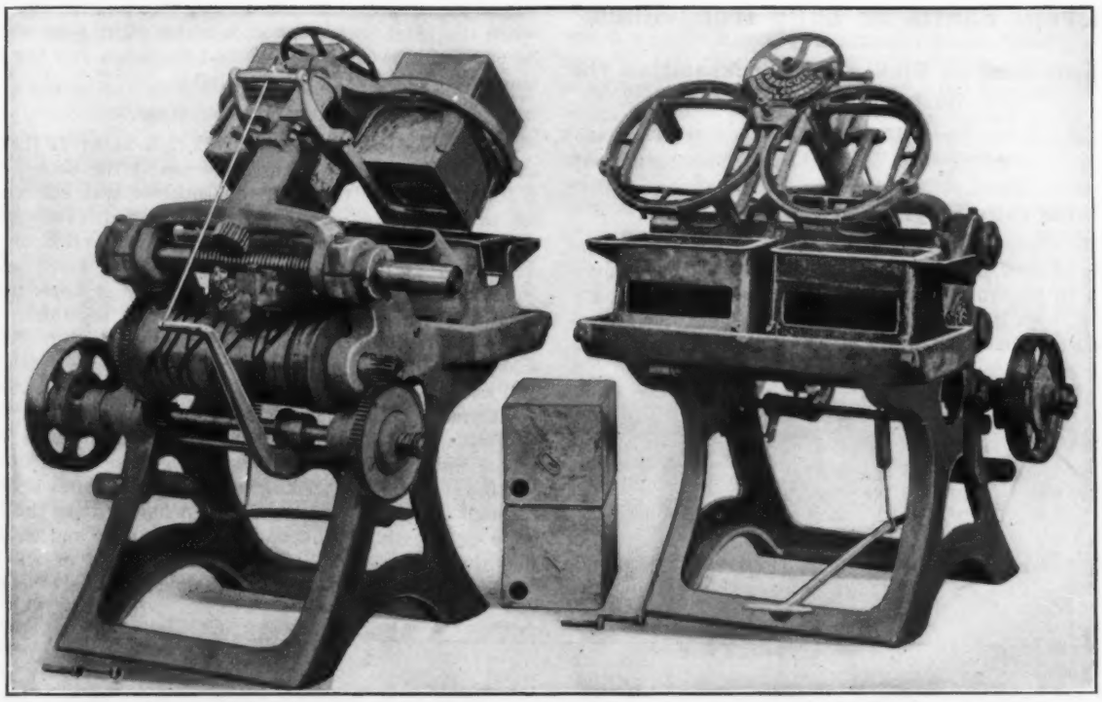


Fig. 3.—Two Views of the End Seam Soldering Machine, with Two Completed Cans Between Them.

shaft, which in turn gives an intermittent rotary motion to the cans. The grooves are so located as to cause the cans to revolve only when they are out of the solder bath. As soon as the can has had its edges soldered and has been ejected, the clutch is automatically disconnected and motion ceases until again started by depressing the treadle. The devices for producing these motions are novel and interesting from a mechanical standpoint. Each machine will dip and solder 32 edge seams per minute, including the time required to drain the drops of solder from the corners.

All of the above mentioned machines were designed by Oberlin Smith, the president and mechanical engineer of the Ferracute Machine Company.

Coke Production in Pennsylvania in 1908.

According to E. W. Parker of the United States Geological Survey, whose report on the manufacture of coke in 1908 has just been sent to the printer, Pennsylvania produced 65.02 per cent. of the total coke output of the United States in 1907 and 59.58 per cent. of the total in 1908.

The quantity of coke produced in Pennsylvania in 1908 was 15,511,634 net tons, out of a total for the United States of 26,033,518 net tons. In 1907 Pennsylvania produced 26,513,214 tons out of a total of 40,779,564 tons. The production in 1908 showed a decrease of 11,001,580 tons, or 41.5 per cent., from that of 1907, or of 7,548,877 tons, or 32.7 per cent., from that of 1906. The years 1906 and 1907, however, were years of plenty in the coal mining and coke producing industries and can hardly be considered representative of the normal production. If, however, the production of Pennsylvania in 1908 is compared with the average of the eight preceding years, it is noted that the production still shows a decrease of 2,597,188 tons, or 14.3 per cent. The production in 1908 was the smallest since 1904.

The conditions in 1908 were almost a direct contrast to those which prevailed during the preceding year. During 1907 until the effects of the financial troubles began to be felt there was scarcely a time that the production was in excess of the demand, whereas in 1908 the occasions were just as scarce when the supply was not in excess of the market requirements. The result of these conditions is exhibited in the proportionately larger decrease in the value of the coke as compared with the decrease in product. The total value of the coke produced in Pennsylvania in 1908 was $32,569,621, against $67,638,024 in 1907, showing a decrease of 51.8 per cent. The decrease in tonnage was 41.5 per cent. The decrease in the value of the production in 1908 was greater than the value of the entire coke output of Pennsylvania in 1904.

The average price per ton obtained for coke in Pennsylvania in 1908 was $2.10 at oven, as compared with $2.55 in 1907, $2.35 in 1906, and $2.05 in 1905. The only reason to be assigned for the excess in the 1908 price over that of 1905 is the fact that operators were able through contracts to maintain prices and thus prevent entire demoralization, and also the fact that a large proportion of the coke produced in Pennsylvania is not placed on the market but is used by the producers themselves or by allied interests, and the value placed upon it is purely arbitrary.

The quantity of coal consumed in the manufacture of coke in Pennsylvania in 1908 was 23,215,964 net tons, valued at $23,250,885. This represents 19.81 per cent. of the total production of bituminous coal in Pennsylvania during the year. In 1907 the consumption of coal in the manufacture of coke was 39,733,177 net tons, valued at $42,732,546, representing 26.4 per cent. of the State's total bituminous coal production. The much smaller percentage in the quantity of coal used for coke making in 1908 as compared with the preceding year indicates that the decrease in the demand for coke by the iron furnaces was in greater proportion than that in the demand for coal from other consumers of fuel. The difference between the value of the coke and the value of the coal from which it was made in 1908 was $9,318,736, or 40.1 per cent.; in 1907 the difference was $24,905,478, or 58.3 per cent.

The number of coke making establishments in 1908 was 252, one less than in 1907, though the total number of ovens in the State increased from 51,364 to 52,606. Of these establishments 44 were idle, and of the 52,606 ovens 3616 were out of blast throughout the year.

The Follansbee Brothers Company, Pittsburgh, is entering a large number of orders for Keystone ventilators for public and manufacturing buildings. Among others received recently is one for six 36-in., for use on buildings of the New York Soldiers' and Sailors' Home, Bath, N. Y.

An arrangement has been made by which Galloways, Ltd., will manufacture large gas engines in Great Britain after the designs of Ehrhardt & Sehmer, the German manufacturers.

Concrete Shafts at Lake Iron Mines.*

Methods Used in Sinking in Quicksand on the Marquette Range.

BY FREDERICK W. ADGATE, CHICAGO.

The Caisson System at the Smith Shaft.

The Cleveland-Cliffs Iron Mining Company in the spring of 1907 made preparations to sink a timber drop shaft, to be called the Smith shaft, located in Swanzy district, near Princeton, Mich. As the ground was known to be saturated with water it was thought advisable to make a few tests to arrive at the flow of water in the overburden at this site. Accordingly several 6-in. pipes perforated most of their length were sunk a number of feet into the ground at the proposed site of the shaft, and two special Cameron pumps, 10-in. steam end and 12½-in. water end, were connected to some of these pipes. Pumping was then started and continued for some time, careful observation being made of the hight of the water in one of the pipes which was not connected to the pumps but was left open for this purpose. Continuous pumping lowered the level of the water so little that the mining company concluded it would be a difficult operation to sink a shaft by the ordinary drop shaft methods. In the fall of 1907 a contract was entered into with the Foundation Company of New York for a reinforced concrete shaft of rectangular cross section whose dimensions would be 15 ft. 4 in. by 11 ft. 4 in.

After an examination of the site and a study of the diamond drill borings which showed about 60 ft. of water bearing overburden made up of quicksand, gravel and boulders to the ledge, the Foundation Company decided to use the pneumatic caisson or compressed air system in sinking this shaft. This use of compressed air in subaqueous excavations has been exemplified and engineers have become familiar with it through the construction of bridge piers, tunnels and building foundations for some years, but was first applied to shaft sinking by the engineers of the Foundation Company. In order to make this application successful special devices, plans and equipment had to be thought out, tried and perfected before the Foundation Company was in a position to guarantee a water tight, indestructible, fireproof and plumb shaft of almost any dimensions or shape. Plans were submitted and accepted by the mining company for a reinforced concrete shaft to be sunk by the pneumatic process. The specifications required principally that the shaft should be carried down plumb and water tight, and that when the ledge was reached, a water tight joint should be effected between the shaft and the ledge, and the contract allowed 90 days for completion.

DETAILS OF THE SHAFT.

In dimensions the shaft was 21 ft. 4 in. by 17 ft. 4 in. outside, with walls 3 ft. in thickness at the bottom and 1 ft. 6 in. at the top, and the concrete was started on top of a timber shoe or cutting edge which consisted of two layers of 12 in. x 12 in. fir timber, beveled on the inside, the bottom stick being shod with a heavy angle iron, and the whole being strongly bolted horizontally and vertically, tying all the timber firmly together. The walls were of concrete strongly reinforced with 1¼ in. and 1 in. square steel bars spaced 6 in. to 8 in. vertically and about 18 in. horizontally. The horizontal reinforcement was designed to take the earth and water pressures, while the vertical rods mainly prevented the lower sections of the walls from pulling away from those above during sinking operations. These vertical rods passed down through the timber cutting edge, anchoring it to the concrete walls. Six feet above this cutting edge and notched into the concrete wall was the deck or roof of what is familiarly called the working chamber. It is of course necessary in using the pneumatic process to confine the air to make its use effective. This is accomplished in shaft work by building a roof or cover over the inside of the shaft strong enough to withstand and hold any required air pressure. This roof, or deck, as it is technically called, may be located at a point near the bottom of the shaft, or higher up, as convenience may dictate. The deck of the Smith shaft was built of 12 in. by 12 in. timbers strongly bolted together and further bolted to the concrete walls at the sides where the deck fitted into the notch in the concrete. These side bolts assisted in taking care of the uplift due to the compressed air on the under side of the deck.

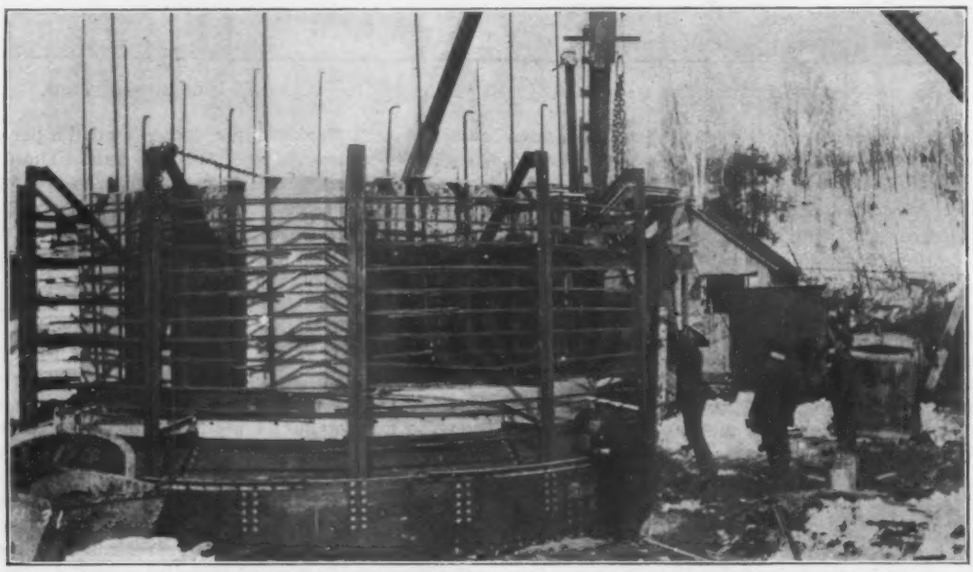


Fig. 1.—View of Caisson, Cutting Edge and Horizontal and Vertical Reinforcing.

After the shaft was on the ledge and a tight joint made with the ledge, the air pressure was removed, and then, owing to the manner in which the deck was notched into the walls, it was readily pulled out and the notch concreted flush with the walls. In the center of the shaft and bolted to the upper side of the deck was the steel man and material shafting, which consists of a number of steel sections ½ in. by 48 in. diameter bolted together with vertical steps or ladders bolted to the inside and extending from the deck to the surface of the ground. The 48-in. steel cylinder was surrounded by an air lock called the Moran lock, which was devised and patented by D. E. Moran, one of the members of the Foundation Company. A hole 3 ft. in diameter was cut in the timber deck, which established a communication between the

* A paper read at the Ishpeming, Mich., meeting of the Lake Superior Mining Institute, August 25-27, 1909.

working chamber below the deck and the man and material shafting above the deck.

METHOD OF CONCRETING.

Work was started on the shaft September 1, but owing to the unprecedented industrial activity at that time, it was impossible to get construction material, and it was not until November 7 that active sinking operations began. The cutting edge was first assembled at the surface of the ground and the inside forms for the first 10 ft. built on top. All other forms were built apart from the shaft in sections 6 ft. high and of interchangeable design. The form material was 2 in. by 8 in., tongued and grooved plank. After the forms had been placed and concreted to a hight of about 18 ft., sinking without air was resorted to until water was encountered, which occurred at a depth of about 5 ft. from the surface. Air was then pumped into the working chamber, and when the water in the working chamber had been displaced by air, gangs were sent into the shaft and excavating began. The material was shoveled into a circular bucket and then hoisted up through the man and material shaft and air lock until the ground surface was reached. The bucket was then dumped into small cars and removed to a point some distance from the shaft, where it was used to level up the ground, the bucket returning to the working chamber for another load. On account of the slow setting qualities of the cement, only one gang of men was required to excavate from 4 p.m. to 12 midnight, in order to keep apace of the erection of forms and concreting, which was done during the day. A regulation contractor's derrick operated by a special three-drum steam hoist was used to handle the excavating buckets, erect the concrete forms and deposit the concrete in the walls.

It was the aim to keep the shaft built up above the ground at least 18 ft. all the time to permit the use of three sections of concrete forms, the lower set being removed as it reached the ground and moved up, as the material was removed from the interior of the shaft and from under the cutting edge. The shaft sank of its own weight until it had reached a depth of approximately 40 ft., when it became necessary to apply additional weight. The only available weight that could be procured at that time was wet sand. This was loaded upon the deck in the interior of the shaft and more added from time to time.

JOINT BETWEEN CONCRETE AND LEDGE.

In this manner the shaft went down steadily until it reached the ledge on December 7, exactly one month from the time air was first applied. The rock ledge was first encountered in one corner of the shaft and proved to have a slope of 3 ft. 6 in. in 20 ft., and in order to make a water tight joint it was necessary to level off this rock and then go down about 2 ft. further in order to get below a seam in the rock. This rock excavation was all accomplished under air pressure. Blasting was resorted to as in ordinary open excavations; however, particular care and knowledge must be exercised to get successful results under these conditions. The rock excavation was completed January 5, 1908. The inside top timber comprising part of the cutting edge was then removed and the walls concreted to the rock, thus presenting a solid masonry face from ledge to surface. This joint was tied to the rock ledge with steel dowels and to the walls above by means of bolts projecting and which had previously held that part of the cutting edge which was cut away and replaced by concrete. Air pressure was maintained on the shaft for three days after the completion of the joint to allow the concrete forming the joint ample time to set before subjecting it to the outside water pressure. The air pressure was then gradually reduced to zero. Subsequent inspections showed that the shaft developed a leakage of about 6 in. of water (650 gal.) in 24 hr., most of it coming through the rock ledge at the bottom, some little percolating along the wires in the walls above, which had been used to hold the concrete forms together. Absolutely no water, not even a seepage, was discernable through the joint. This was all that could be anticipated or hoped for, and I have since been informed that most of the leaks have dried up.

At the top of the shaft an opening 7 ft. in hight by 8 ft. 8 in. in width was left in the southeast wall from which was constructed a concrete tunnel running horizontally and at right angles to the shaft. This eventually will communicate directly with the cage and ladder ways, and was placed at such an elevation as to pass beneath the standard gauge tracks which will handle the ore. This tunnel has side walls and roof 18 in. in thickness, is rectangular in cross section, its length overall is 34 ft. 6 in. The side walls and roof, directly over where the ore trains pass, were reinforced with plain steel bars, but the greater part of the roof was reinforced with 1⅛-in. steel cable, which was found conveniently at hand.

After sinking operations were completed and the temporary weight of wet sand together with the deck, was

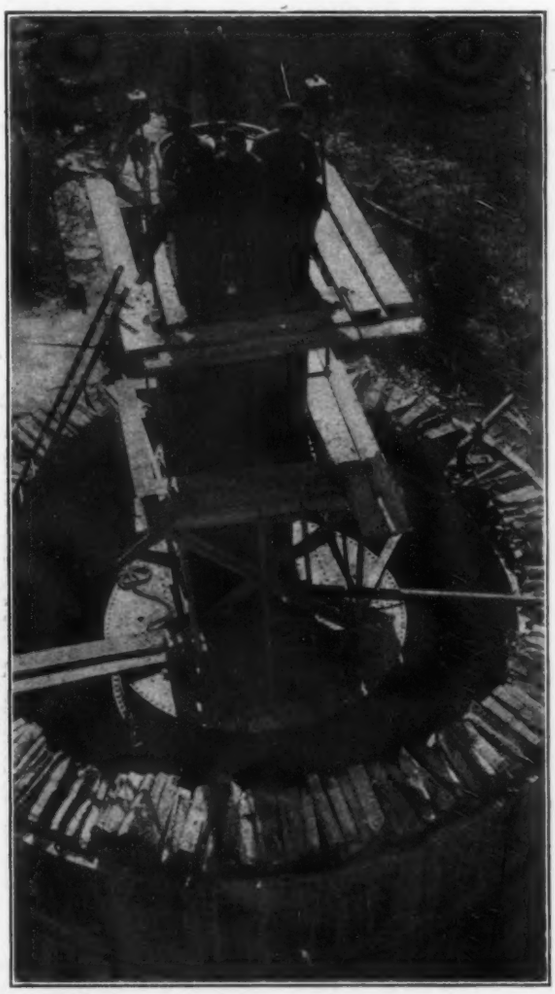


Fig. 2.—Air Lock on Large Dredging Shaft.—Pig Iron Piled on Concrete for Additional Weight.

removed, holes were drilled and heavy cast iron brackets bolted against the walls. These brackets carry horizontal channel irons dividing the shaft into compartments for skips, cage and a pipe and ladder way. It is further proposed to sheath these compartments with corrugated iron or similar fireproof material.

The Kidder Circular Shaft.

After the successful completion of the Smith shaft, the Cleveland-Cliffs Iron Company entered into a contract with the Foundation Company to sink the Kidder shaft, which is located in the same district and within ½ mile of the Smith shaft. Here the conditions are somewhat different. The general character of the overburden is the same, but it is deeper, and the ledge is more broken up and seamy. It was decided that a circular shaft was best adapted to this particular site.

Plans were accordingly drawn for a reinforced concrete structure of a circular cross section, being 24 ft. in outside diameter and having an inside diameter large enough to provide a rectangular space 14 ft. 10 in. by 10 ft. 10 in. The walls of the shaft were built upon a

fabricated steel shoe, being 24 ft. in outside diameter, where it is riveted to a steel cone plate on the inside, the slope of which extends up to a hight of 10 ft., making the working chamber or caisson conical in shape and providing a circular opening at the top of the chamber or cone of a diameter of 10 ft. To the top of this are bolted steel sections 10 ft. in diameter, carried up section by section as the structure sinks. Through this cylinder was operated a clamshell dredge, the cylinder also acting as a wall of the caisson while sinking operations were conducted by the pneumatic process.

PLAN OF SINKING.

The general plan of sinking the Kidder shaft was as follows: The shaft was erected some 15 ft. in hight, and two sections of the dredging cylinder were connected to the top of the cone plates. A clamshell dredge was then lowered through the 10-ft. dredging shaft into the bottom where digging operations began. As the clamshell displaced the material, the shaft settled by its own weight. Care had to be taken to build on the top fast enough to keep the top of the structure always several feet above the surface. This plan of sinking was followed until the shaft had reached a depth of 87 ft. below the surface, where a stratum of very hard clay was discovered which the dredge refused to handle. A steel

Fig. 3.—Joint Between Concrete and Ledge, Smith Shaft.

deck or roof was then bolted to the top of the dredging shaft. This deck, in turn, supported a Moran air lock, and compressed air operations were immediately begun. The shaft was carried down to the ledge, which was found to be 104 ft. from the surface. The ledge was so broken up and seamy that it was found necessary to take the shaft 9 ft. into the ledge, making a total excavation of 113 ft. from the bottom to the collar of the shaft, or 103 ft. below water elevation.

CUTTING SHOE AND WALL CONSTRUCTION.

The cutting edge or shoe, the inside of which forms the conical space at the bottom of the shaft, deserves, I think, further mention. It weighs approximately 40,000 lb., and is made in three horizontal sections, and each section is made up or 12 plates of ½-in. steel, joined to the succeeding section by a lap riveted joint. On the outside of the bottom there is a steel plate 30 in. high by ⅝ in. thick that forms the base of the cylinder, and the outside form of the wall of the shaft to which the steel brackets and plates which form the cone are attached. The angle or slope of the cone on the inside with the outside of the shaft is made the shape of the brackets. This slope is the ratio of 7 to 10, or about 40 degrees, with the vertical or sides of the shaft. These brackets are riveted to the heavy outside plate and to all the plates forming the cone. There are 12 of these brackets, and they are made in two parts bolted together so that one part is readily detachable from that part of the steel work which necessarily remains in the concrete and forms part of the permanent wall.

In the construction of the walls of the shaft, two sets of forms were used, one on the outside and one on the inside. The outside form is made of three sections 5 ft. high and 24 ft. in diameter. Each section is, in turn, made up of six plates of ½-in. steel bent to a 12-ft. radius on the inside. On all four sides of these plates 4-in. angles are riveted to make the necessary connections of the several pieces to form the circle, and also to connect the sections one to the other to make the wall continuous, proper bolt holes being punched at certain intervals in the angles to make this possible. The inside forms were also made in three sections, each section being constructed from 2 x 6 in. tongued and grooved pine, held together by three sets of 4 x 4 x ½ in. angles bent to the radius that will give the necessary thickness of the wall at the various depths of the shaft.

The thickness of the walls of the shaft varies, of course, with the depth the shaft has to go and the pressures that will come on the wall. In the case of the Kidder shaft, the wall at the top is 2 ft. thick down to a depth of 17 ft. It is there increased to a 2 ft. 6 in. wall, to a depth of 50 ft., then increased to a 3-ft. wall at this point and carried to a depth of 82 ft. It is there increased to a 3 ft. 6 in. wall and carried with that thickness to the bottom, 113 ft. below the surface. The Kidder shaft was strengthened by a system of reinforcing steel placed in a manner similar to that described in the Smith shaft.

EMERGENCY MEASURES.

In order to sink the Kidder shaft to the depth it finally went it was necessary to use 375 tons of pig iron, in order to overcome the excess of friction encountered and the upward pressure of the compressed air over and above the weight of the structure itself.

At a point 87 ft. below the surface, a very hard stratum of clay some 2 ft. thick was discovered. After dredging some hours without much success the clay was penetrated at one point only and the quicksand which underlies the clay started to run into the interior of the shaft, causing a run-in or slump of the ground on the outside of the shaft at one point only, which extended to the surface and threw the shaft some 6 in. out of plumb. Dredging was then abandoned, and the shaft equipped to carry on further sinking operations by the pneumatic process. This method was used until the completion of the shaft. When the shaft had been sunk into the ledge some 9 ft. a concrete joint was constructed similar to that described in the Smith shaft.

Work was started on the Kidder shaft on August 15, 1908, and completed January 15, 1909. The maximum air pressure used was 45 lb. above atmosphere. This is about the limit of human endurance, and very dangerous to the men employed inside the shaft. At the greatest depth, two shifts of 40 min. each constituted a day's work, and while no fatal effects followed three of the men are to-day suffering from partial paralysis, and will never wholly recover from its effects.

The Smith and Kidder shafts represent the advanced methods of shaft sinking through water bearing ground which are being carried on in this country to-day. The advantages of these shafts over the old style timber drop shaft are the following: First, they shut off all surface water, doing away with the expense of pumping. Being of concrete, they are fireproof. They will never have to be relined or renewed. They are plumb and can be completed in much less time than shafts sunk through the same material by ordinary methods. Figs. 1 and 2 are typical illustrations of the equipment and method. Fig. 3 is from a photograph taken at the Smith shaft.

The Ludlow Valve Mfg. Company, Troy, N. Y., has elected the following officers: President, James H. Caldwell; vice-president, Marcus Steine; treasurer, Max Nathan; secretary, J. W. Mack; chairman of the Board of Directors, John T. Christie. Mr. Caldwell, who succeeds Mr. Christie as president of the company, has been vice-president and general manager for the past ten years.

The Bristol Quick-Reading Electric Pyrometer.

Electric pyrometers of the form invented by William H. Bristol and made by the Bristol Company, Waterbury, Conn., have been made in both switchboard and portable form to indicate or record high temperatures, but most of the instruments now in service are for ranges of temperature below 2000 degrees F. There are processes employing excessively high temperatures which should be measured intermittently to make control possible and to obtain a uniform product. In experimental work temperatures in the neighborhood of 2500 degrees F. should often be measured, as, for instance, in boiler tests, where the boiler furnace temperature is to be determined.

A new quick reading form of the Wm. H. Bristol pyrometer has been designed and preliminary models tested in actual service in several different processes where the temperatures are excessively high and the requirements very severe. This special pyrometer consists of a patented compound thermo-electric couple used in connection with a special portable instrument equipped with a pivot jewel bearing Weston movement. The complete outfit is shown in Fig. 1. In this view the couple is shown with the protecting sheath pulled back against a stop, leaving the tip of the thermo-couple exposed. When a reading is to be taken with this special thermo-couple it is inserted in the furnace or kiln, with the tip protected from mechanical injury, as shown in Fig. 2, and as soon as the couple has been inserted far enough the iron pipe protecting sheath is slipped back so that the tip is exposed to the hot gases whose temperature is to be measured. After a reading has been taken the couple should be quickly withdrawn and partially cooled off before another reading is taken.

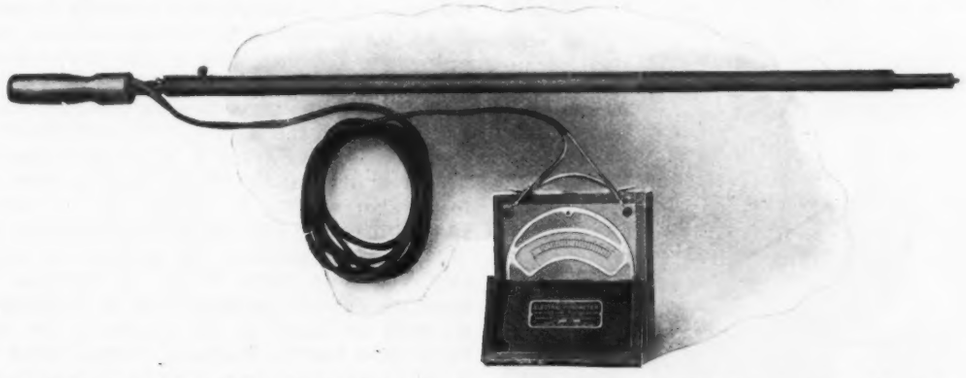


Fig. 1.—The Wm. H. Bristol Portable Electric Pyrometer for the Quick Reading of High Temperatures, Made by the Bristol Company, Waterbury, Conn.

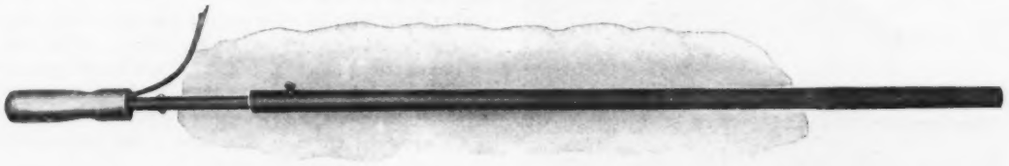


Fig. 2.—The Thermo-Electric Couple with Protecting Sheath Over the End.

This form of couple is also the invention of Prof. Wm. H. Bristol, formerly of Stevens Institute and now president of the Bristol Company. The compound construction of this couple is shown in Fig. 3. The point A corresponds to the regular junction of an ordinary thermo-couple, and the two elements which join at the point A are platinum and platinum-rhodium; this is the particular couple selected as a standard by the German Government. The platinum platinum-rhodium elements extend to the points B and C, where they are welded to two other wires made of inexpensive alloys which are such that the electro motive forces generated at B and C are practically equal and opposed when these junctions are both exposed to temperatures not higher than 1200 degrees F. These inexpensive alloy elements are extended to the point D, which is the cold end of the couple.

This construction of the quick reading couple is such that the platinum-rhodium tip of the couple A may be exposed to excessively high temperatures up to 3000 degrees F. without having the temperature of the junctions B and C exceed a safe limit. The temperature at A may be quickly measured with this special couple, as the platinum-rhodium tip is exposed directly to the hot gases in the furnace or kiln. In this way an inexpensive substitute is provided for the expensive platinum-rhodium couples previously employed for the measurement of such high temperatures.

This quick reading form of pyrometer has been tested under very severe conditions and found extremely valuable for measuring the temperatures in brick kilns, boiler furnace fire boxes, by-product coke oven combustion flues, soaking pits, &c. The complete outfit is portable, and reading of temperatures in the neighborhood of 2500 degrees may be obtained in a very few seconds after inserting the tip of the couple to the point where the temperature is to be measured. By using a special form of the platinum platinum-rhodium tip this type of thermo-couple can be used to measure the temperature of red hot surfaces of metal or other material.

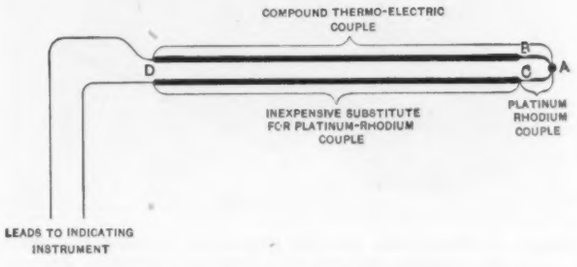


Fig. 3.—Diagram showing the Parts of the Compound Thermo-Electric Couple.

Oiling Systems.—The growing importance of efficient lubrication for the care of costly heavy duty engine installations has received such serious attention at the hands of the engineering corps employed by steel manufacturers and other interests controlling large power plants that a changed attitude toward oiling systems has resulted. The large outlays now considered warranted would not have been entertained a few years ago, but costly investments in engine units would now be considered jeopardized if not protected by the most scientific and positively efficient means of insuring thorough lubrication. Orders for important oiling systems of this character have been recently placed with the Pittsburgh Gage & Supply Company, Pittsburgh, Pa., by the Illinois Steel Company, Chicago, Ill., and the Jones & Laughlin Steel Company, Aliquippa, Pa., and for less extensive systems by the Pfau Mfg. Company, Cincinnati, Ohio, and the De Forest Sheet & Tin Plate Company, Niles, Ohio.

A New Colburn 30-in. Vertical Boring Mill.

A number of improvements are embodied in the new 30-in. boring and turning mill, Fig. 1, recently put on the market by the Colburn Machine Tool Company, Franklin, Pa. The most radical feature is the design of the main drive or headstock. This is all inclosed in a separate box or frame which is adapted to be quickly detached from the main frame or housing and removed bodily therefrom. This construction makes it very convenient in assembling, enabling the fitting to be done much more easily and better. It is also of advantage when making repairs as then accessibility of all parts is very important. Another important improvement is the addition of a foot brake for quickly stopping the machine with the table in any position. This is a feature not generally found on small mills.

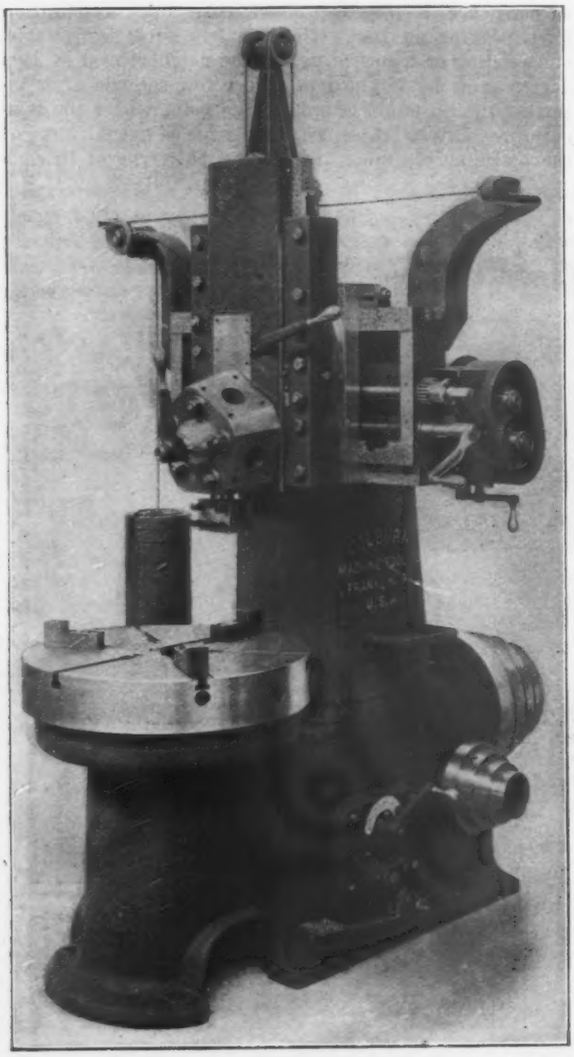


Fig. 1.—A New 30-In. Vertical Boring and Turning Mill Built by the Colburn Machine Tool Company, Franklin, Pa.

The turret head is five sided and is set at an angle of 8 degrees, which gives it plenty of clearance for large tools when swung over the slide. The turret slide can be swiveled to any angle up to 30 degrees, either side of the center. A graduated scale with a pointer makes it easy to measure the depth of cut. A plain table or a three or four jaw chuck can be furnished. The main spindle has 16 changes of speed and there are eight feeds vertically and horizontally. A two-speed countershaft is furnished with the machine.

Fig. 2 shows a cross section of the lower part of the machine. The headstock shown in Figs. 3 and 4 is here shown in cross section in working position. The shaft *a* is driven by the cone pulley *b*. The gear *c* and the pinion *d* are keyed to this shaft and drive the gears *e* and *f*, which revolve loosely on the shaft *g* and are oiled through holes drilled in the middle of the shaft which carry oil from the bearings *h* and *i*. A clutch, *r*, operated by a handle on the outside of the frame directly above the foot brake (see Fig. 1), having teeth on both faces, is adapted to engage with similar teeth on the gears *e* and *f*. This gives two speeds to the gearing, and with a four-step cone pulley eight speeds are obtained. The two-speed countershaft increases this to 16 speeds. Special attention is called to the provisions for lubrication. Brass tubes starting from one common center (see Figs. 3 and 4) lead to every bearing in the headstock. To oil all the bearings it is only necessary to lift the cover on the guard, shown in Fig. 3, and pour oil into the tubes which converge at this point, as shown in Fig. 4. Another special feature is the manner of oiling the bearing of the vertical shaft *j*, Fig. 2. This shaft runs in a large bushing, *k*. An oil pocket, *l*, surrounds the bushing and is filled with oil. A wick, *m*, starts from the pocket *l*, leads upward through the slot *n* on the outside of the bushing *k*, over the top of the bushing and down through the slot *o* on the inside of the bushing. This method insures practically perfect lubrication, since the oil is only fed through the wick as it is used, on the principle of an oil lamp, and as long as there is oil in the reservoir the wick will feed it to the bearing. Even after the oil in the reservoir is gone the wick will hold a sufficient quantity to insure the bearing running a long time without cutting. Oil is supplied to fill the reservoir from the out-

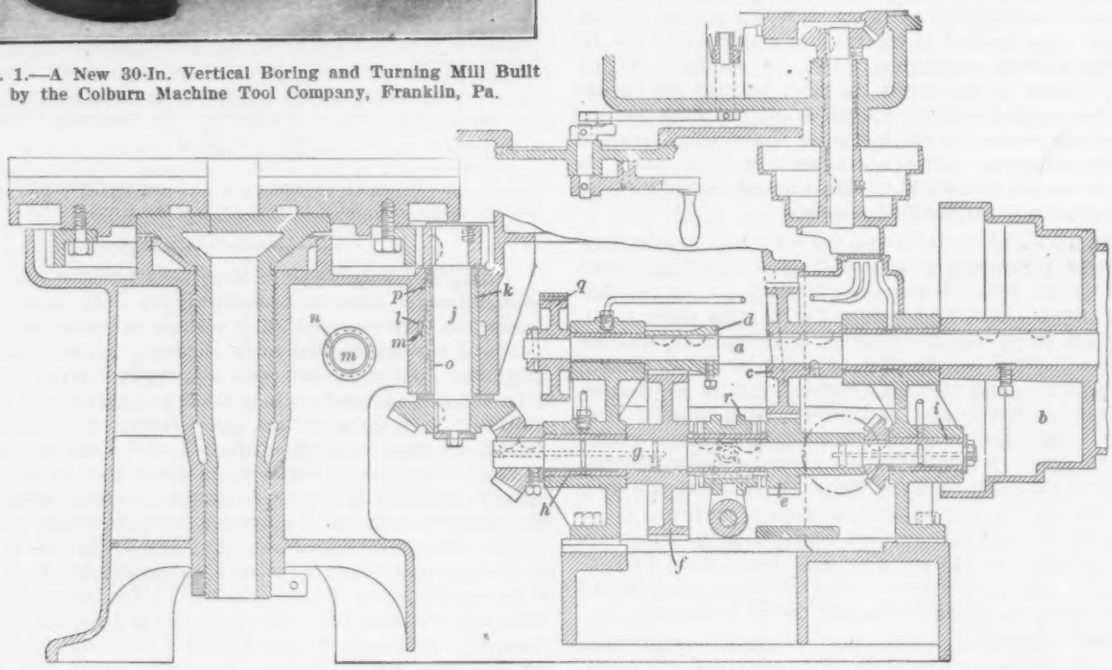


Fig. 2.—Side Sectional Elevation of the Lower Part of the Machine.

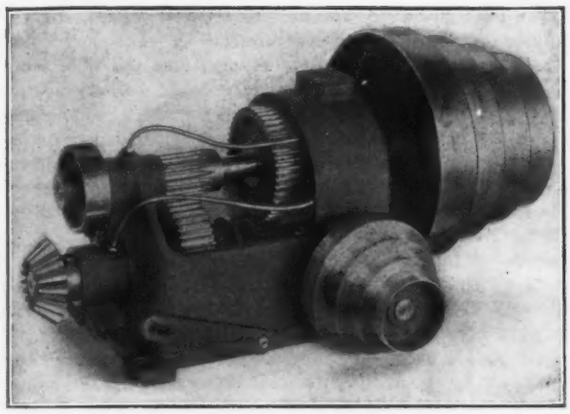


Fig. 3.—View of the Headstock with the Oil Cover in Position.

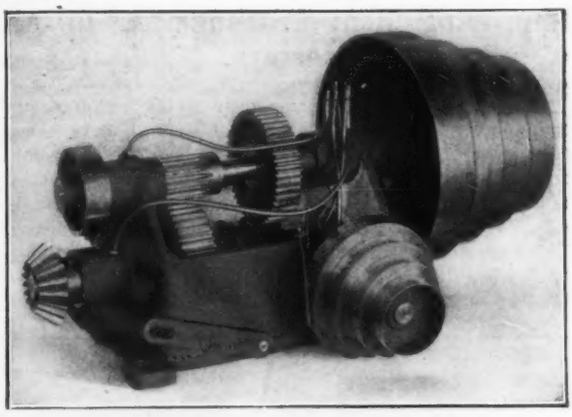


Fig. 4.—Another View of the Headstock, Showing the Oil Tubes.

side through a pipe shown directly in front of the tool pan in Fig. 1. This pipe leads to the annular groove *p*, from whence it flows downward to the reservoir *m*. Thus two supplies of oil are maintained, one at *p*, the other at *m*, making it practically impossible for the bearing to ever become dry.

The band wheel *q* in Fig. 2, also shown in Figs. 3 and 4, directly above the bevel gear, is used in connection with the foot brake for stopping the machine. The details of this device are clearly shown in Fig. 5.

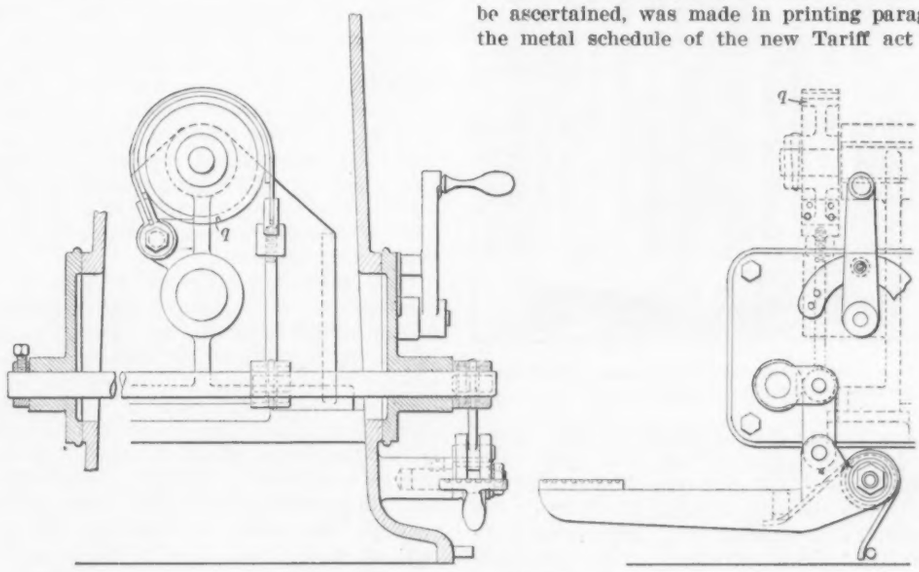


Fig. 5.—Details of the Headstock Control.

Customs Decisions.

Metal Photograph Frames.

Photograph frames of cast imitation bronze fitted with lithographs are held by the Board of United States General Appraisers to be assessable properly as manufactures in chief value of metal, and dutiable accordingly at the rate of 45 per cent. ad valorem. This was the assessment made by the Collector of Customs at New York. Lazarus, Rosenfeld & Lehmann, New York, the importers, being dissatisfied with this decision of the collector, appealed to the Board of Appraisers, alleging that the goods should be admitted to entry at 20 per cent. under the provision in the Dingley Tariff act for "statuary." Judge Waite in his decision for the board says that the importers have failed to offer evidence, while an inspection of the official papers in the case indicates no reason for disturbing the collector's ruling. The protest is therefore overruled.

Bronze Ornamentation.

A protest filed by L. Alavoire & Co., New York, protesting against the classification of marble vases with bronze mounts and marble columns with bronze ornamentation, was decided in favor of the Government. It is held that the articles are dutiable as manufactures in chief value of metal at 45 per cent., and not, as claimed by the importers, at 20 per cent. under the provision for "statuary."

The Ferroalloy Duties.

An unfortunate error, the cause of which cannot now be ascertained, was made in printing paragraph 184 of the metal schedule of the new Tariff act in the pamphlet recently sent to the readers of *The Iron Age*. The error consisted in the omission of the duty on ferroalloys valued at more than $200 per ton, on which the rate is 20 per cent. ad valorem. The correct paragraph is as follows:

184. Chrome or chromium metal, ferrochrome or ferrochromium, ferromolybdenum, ferrophosphorus, ferrotitanium, ferrotungsten, ferrovanadium, molybdenum, titanium, tantalum, tungsten, or wolfram metal, valued at two hundred dollars per ton or less, twenty-five per centum ad valorem; valued at more than two hundred dollars per ton, twenty per centum ad valorem; ferrosilicon, containing not more than fifteen per centum of silicon, five dollars per ton; ferrosilicon containing more than fifteen per centum of silicon, twenty per centum ad valorem.

A New Lead Pipe Plant at Pittsburgh.—The American Lead Company, recently organized at Pittsburgh, and with which the Pittsburgh White Metal Company of that city is interested, has completed its plant at 3112-3114 Penn avenue. The building, 40 x 100 ft., is of substantial construction, of steel frame with steel roofing and siding, set on heavy concrete foundations. It has been equipped with modern machinery for the manufacture of a full line of lead pipe in sizes from 1-16 to 8 in. in diameter, and lead specialties of all kinds, solders, &c. The organization is composed of experienced and practical men and the products will be sold to the plumbing and roofing trade through various branch offices located in different cities.

Improving Heat Transmission in Air Heaters.

The transfer of heat between metal surfaces and fluids is involved in the operation of steam boilers, closed feed water heaters, heating coils and radiators, economizers, condensers, evaporators, cooking kettles, &c. The rate of heat transference attainable obviously influences the design of these several apparatuses to a marked degree. This rate may be expressed commercially as the number of British thermal units transferred per square foot of heating surface per hour per degree difference of temperature, and is usually designated by U. The magnitude of U is obviously affected by the following factors: the temperature, nature and condition of motion of the medium from which the heat is being transmitted; the thickness, material and condition of the intervening plate or tube surface, and the temperature, nature and condition of motion of the fluid which is being heated. How great the influence of these several factors is upon the activity of the heat transmitting surface will be apparent from an approximate statement of the values obtained in several different kinds of apparatus.

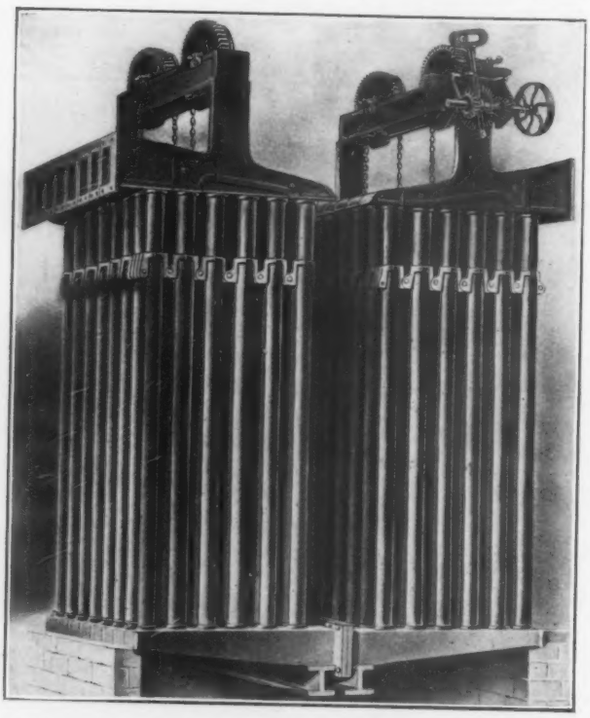


Fig. 1.—A 96-Tube Waste Heat Air Heater Built by the Green Fuel Economizer Company, Matteawan, N. Y.

For boilers and economizers the value of U appears to vary between 2 and 3½ heat units per square foot per hour per degree difference of temperature. In heat exchangers—that is, appliances in which heat is transferred from one liquid to another through a metal surface, values of 50 to 60 are given for U. In closed feed water heaters it is usually between 200 and 300, while in certain modern types of surface condensers values approaching 1000 are being obtained. Such a wide range of values cannot but cause the engineer to ask whether or not the performance of any one particular type of the apparatus is at the maximum possible or can be improved by changes in design or in methods of operation. In this article are described some experiments made with this point in view upon a Green waste heat air heater, such as that shown in Fig. 1, a device for heating air directly from gases of combustion and similar in its general arrangement to the Green fuel economizer.

It should be noted that whether air be heated in this device or by the ordinary means of steam coils the source of the heat and its final destination are the same in each case. Where steam is used the heat is first transmitted from hot gases of combustion to the metal of the boiler, thence to the water and steam in the boiler, and again from the water or steam to the metal of the heating coil or radiator and finally to the air. In the present device the heat is transmitted from hot gases to the walls of the metal pipes and from these immediately to the air. With the same difference in temperature between the hot gases of combustion and the air the capacity of the waste heat air heater would undoubtedly be greater than the capacity of twice the amount of combined boiler surface and radiator surface, other conditions being equal. However, the heater is more usually employed for recovering heat from gases of combustion after the latter have already done service in a steam boiler or other apparatus—that is, the heater is usually employed as a means of fuel economy, saving the waste heat that would otherwise escape through the chimney to atmosphere, and applying it to purposes for which steam would otherwise be required or using it to preheat the air supplied to the furnace, thus increasing the temperature and efficiency of the latter.

In consequence of receiving gases at a lower temperature the total amount of heat transmitted per square foot of surface is usually not as great as in a boiler, although the activity of the surface as measured by the number of heat units transferred per square foot per hour per degree difference of temperature is greater, particularly when the apparatus is operated with the special appliances herein described. As compared with a steam heater coil or radiator, the activity of the waste heat air heater is comparatively high, due to the greater range of temperature, for while an exhaust steam heated radiator will rarely have a temperature much higher than 212 to 220 degrees F., or a live steam heated radiator higher than 400 degrees F., the waste heat air heater may be receiving gases of a temperature of 1000 degrees F. or higher, as, for instance, the stack valve gases of water gas generators or the waste gases from metal furnaces. When the apparatus is installed to receive the chimney flue gases from a steam boiler the temperature will as a rule be between 500 and 650 degrees F. The final temperature of the air heated by the apparatus

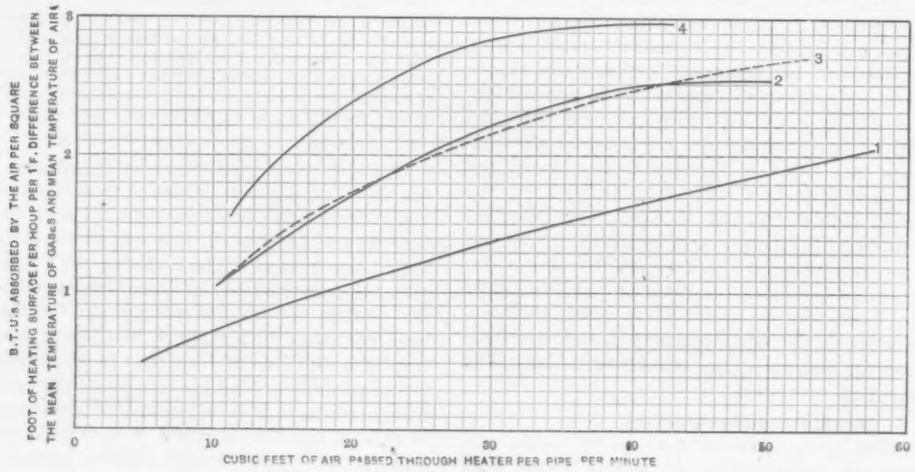


Fig. 2.—Curves of the Results of Tests on Heat Transmission in a Green Air Heater.

will be determined by the use that is to be made of it. For heating and ventilating rooms in buildings this will be quite moderate, while for drying work it will be limited as a rule by the nature of the material being dried, although temperatures above 500 or 600 degrees F. are sometimes employed.

The apparatus can be so connected up that the air will be passed through all the pipes in parallel or through groups placed in series. In the latter case it is customary to have the air enter the apparatus at the cold end—that is, the end from which the gases of combustion are leaving, and to leave the apparatus from the hot end—that is, the end with which the gases of combustion first come in contact, as by this means the greatest average difference in temperature is maintained throughout the apparatus. A perfect apparatus arranged in this way would be able to transfer all the heat of the hot gases to the cold gases. In making arrangements of this kind it was discovered that if the same number of cubic feet of air were put through the heater with one-half of the pipes arranged in series with the other half the amount of heat transmitted per square foot of surface per hour per degree difference of temperature was increased 50 to 75 per cent. This confirms results obtained by the engineers of the United States Geological Survey and by other investigators upon steam boilers. It appears that the transfer of heat to and from a gas is almost entirely by convection, so that anything that is done to increase the commotion or to increase the rate at which the cold gas is removed from the surface and hot gas substituted will increase the rate of heat transmission. If motion is not given to the gas mechanically or by natural gravity circulation, the transfer of heat can only take place by diffusion, which may be conceived of as a process of gas molecules receiving high velocity from the hot plate and expending it upon slower moving molecules a little distance away from the plate, these in turn passing it on to others. The transfer of heat through gases by diffusion is an exceedingly slow process, as witness the many engineering appliances in which heat insulation is secured by means of dead air spaces.

The success obtained from merely increasing the velocity of the air blowing through the pipe naturally led to the suggestion that the rate of heat transference could be still more increased if the air were churned up and the cold core gas in the center of the pipe brought more positively into contact with the walls. To this end specially winged spirals were inserted in the pipe, with results wholly justifying the reasoning, for the rate of heat transfer was increased in about the same ratio as by doubling the velocity of the air.

The results of these experiments are shown in the several curves in the diagram, Fig. 2, where the line marked 1 shows the heat transmitted per square foot per hour per degree difference of temperature for various numbers of cubic feet of air passed through the heater per minute. Curve No. 2 shows the same values for the same heater with the same volume of air passed first through one-half and then through the other half of the tubes in series. Curve No. 3 shows the values obtained by passing the air through all the tubes in parallel, but with winged spirals in the tubes, while No. 4 shows the values obtained with the spirals and the two groups of tubes in series. Curve 1 in this diagram is especially interesting since it is nearly a straight line, showing that the rate of heat transmission increases almost directly as the velocity of the air, a result which had already been demonstrated by the United States Geological Survey. In all these experiments the exteriors of the pipes were kept free of soot by means of automatic scrapers similar to those used on the economizer.

For the above information and the accompanying illustrations we are indebted to the builder of the device, the Green Fuel Economizer Company, Matteawan, N. Y.

Firth Steel.—E. S. Jackman & Co., Chicago agents for the Firth-Sterling Steel Company, successor to the American business of Thomas Firth & Sons, Ltd., Sheffield, England, have issued a circular which most confidently makes broad claims for the quality of Firth steel. Jackman & Co. have been agents for this steel for the past 10 years and have evidently been able to build up a large trade in it, as the circular gives the names of no less than 14 salesmen connected with the Chicago agency. The circular pays special attention to Blue Chip steel, which has shown phenomenal cutting capacity in lathe tools, milling cutters, taps, dies and drills, stating that this steel is on the market at a price far below its true worth to the purchaser.

Ferrotungsten Powder.

Vivian Bond & Co., 68 Beaver street, New York, are American selling agents for the Chemische Fabrik, Fuerth, Bavaria, manufacturer of ferrotungsten in powder. This is a material which is of considerable interest to makers of special steel. Ferroalloys in the form of powder are not new to the industrial world, but often examination under the microscope reveals simply a mechanical mixture of the particles of the different constituents, no chemical combination existing between the iron and the other metals. Tests made on ferrotungsten powder have failed to reveal any such lack of chemical combination. They have shown also that no separation of the different constituents can be made by means of a magnet; and, further, even by long continued action of chemical reagents, no separation of iron takes place. An analysis made in the course of these experiments gave the following result: Wolfram, 85 per cent.; carbon, 0.30 per cent.; silicon, 0.45 per cent.; manganese, 0.45 per cent; aluminum calcium magnesia, 0.25 per cent.; sulphur, 0.01 per cent.; antimony, phosphorus, copper, arsenic, not ascertainable. This analysis indicates high chemical purity.

From practical trials conducted with the powdered alloy it was ascertained that there was considerable scope for the use of the material in the manufacture of high tungsten steel for high speed tools, particularly in view of the difficulties which tool steel manufacturers experience in the course of their work; for these difficulties appear to bear a direct relation to the selection of the tungsten or chrome alloys used.

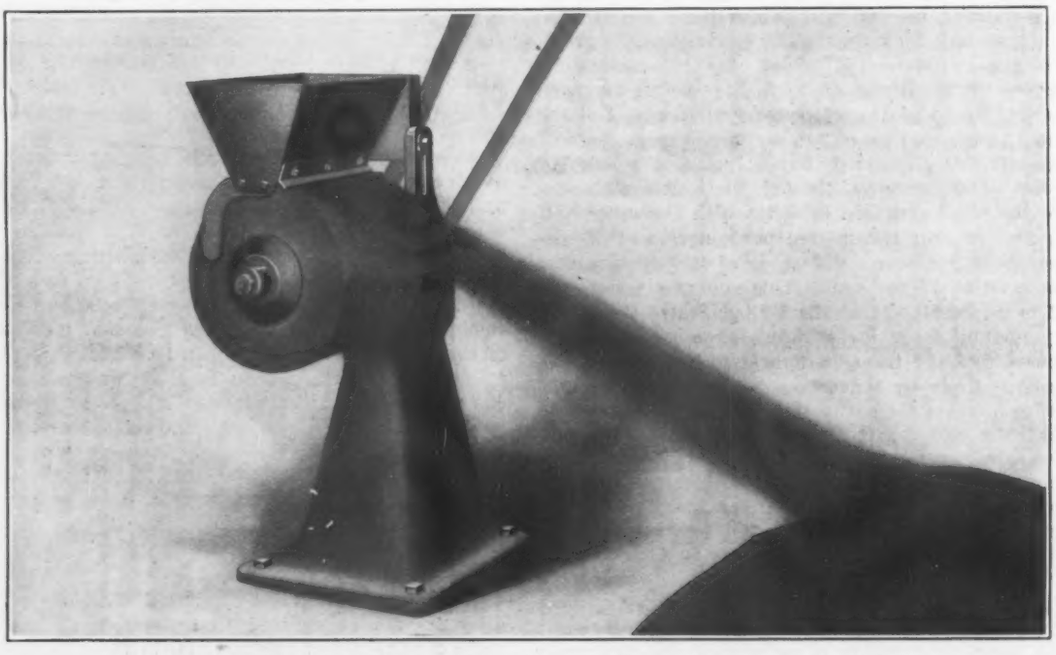
Next to the chemical purity of the alloy comes its capacity for alloying with the metal, and this again depends on the melting point of the respective metals which are added to the steel. The nearer the melting point of the alloy is to that of the iron or steel, the better the iron and metal will alloy—that is, so much more readily will the development of the metallic carbides proceed. As the melting point of ferrotungsten is considerably under that of tungsten metal, the powdered ferrotungsten should be very much more suitable for the manufacture of special steel than metallic tungsten. In addition to this the oxidation of the ferroalloy is much smaller than in the case of pure, or almost pure, metal. Very little tungsten goes into the slag, so that the loss of this expensive material is practically nil.

It is obvious that, owing to the ferrotungsten being in powder, its ability to alloy will be increased, while the oxidation will, at least, not be higher. From this capacity for alloying, and the very small amount of oxidation, practical advantages result, as will be appreciated by every steel maker. First, the steel pours in a very liquid state. Next, vigorous mechanical mixing by repouring is not necessary to such an extent as is the case with pure tungsten metal, the specific gravity of which is much higher than that of ferrotungsten; for while the former, at the beginning of the process, settles at the bottom, the latter mixes better with the steel. Further advantage resulting from the facility in alloying appears in reduced piping of the steel. Finally, the superior qualities of the product for forging should decide the steel maker to select for the manufacture of his high speed steel a material which will guarantee him a smooth and regular process of manufacture. Ferrotungsten powder, accordingly, seems to possess several advantages, as compared with ferrotungsten in lumps and the metallic tungsten, the latter containing 96 to 98 per cent. of tungsten.

The Bilz Sand Mixer and Sifting Machine.

A machine for the foundry intended to take the place of the ordinary sand screens or riddles, and which accomplishes at the same time the function of mixing the sand preparing it for use, is the Bilz combined sand mixer and sifting machine now being introduced by Walls, Bray & Co., 83 Walker street, New York City. The accompanying illustration shows the machine in operation depositing a pile of sifted sand.

The machine is extremely simple, consisting merely of



The Bilz Combined Sand Mixer and Sifting Machine, Sold by Walls, Bray & Co., New York.

a cylindrical wire brush running at about 1000 or 1100 rev. per min., located immediately below and almost touching the bottom of a hopper through which the sand is fed for treatment. The rapidity with which the brush revolves serves to throw out all foreign material, such as stones, wood, nails, &c., depositing the refuse in a heap well beyond that into which the sand is thrown. The sand in traveling through the air is thoroughly mixed, and is deposited in better shape, it is claimed, for casting than can be secured through hand treatment.

The machine aside from its large capacity, which is nominally from 50 to 75 barrels per day, eliminates the necessity of drying the wet French sand before putting it through the sieve, avoids the danger arising from broken wires, common in the old process, and has other apparent advantages. The brush is belt driven, and is practically self-lubricating.

The Maymont Self-Oiling Loose Pulley.

A loose pulley that is claimed to be positively self-oiling, thoroughly lubricated under all conditions and to give the same reliable service as the most modern types of self-oiling shaft bearings is the Maymont self-oiling pulley, Fig. 1, sold by the McMaster-Carr Supply Company, 176 Lake street, Chicago, Ill.

The pulley, as shown in Fig. 2, is made in halves, with a combination set and oiling collar between. The hub is

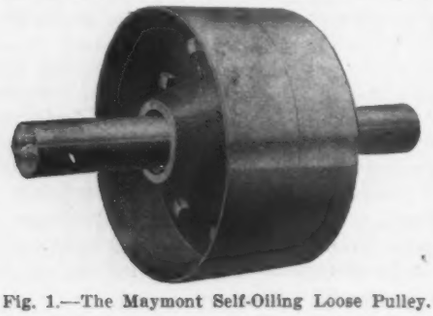


Fig. 1.—The Maymont Self-Oiling Loose Pulley.

enlarged to inclose an oil reservoir and the halves are bolted together with a thin oil proof gasket between to prevent leakage. The oil distributing collar is fixed to the shaft by two set screws and serves also as a set collar, so that no outside collar is needed. Clearance at the sides of the collar allows for necessary play sidewise along the shaft.

In Fig. 3 may be seen the collar with its two set screws. All the rest of the pulley is free to rotate on the shaft. The collar has two curved wings or lips, BB, extending outward nearly to the outer circle of the oil reservoir. Close inside these wings are diverging drilled holes, CC, through the body of the collar, leading to the shaft at each side. Cored into the hubs at their outer

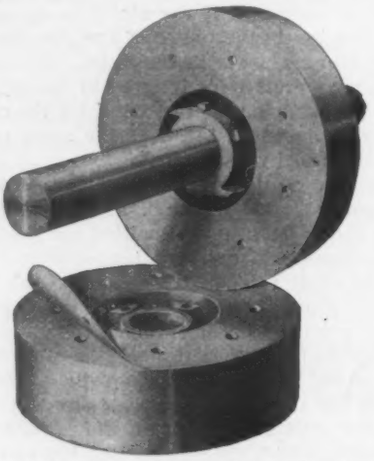


Fig. 2.—The Pulley Halves Separated, Exposing Collar and Oil Cavity.

ends are the recesses D and E, the former closed and the latter open, as shown. Connecting these recesses with the central oil reservoir are four drilled ports, FFFF, diverging from the shaft. As the pulley rotates, these holes, at their reservoir ends, constantly pass close to the wings of the fixed collar.

The operation is as follows: Oil in the reservoir, as the pulley rotates, is carried by the wings BB of the collar to and into the holes CC leading to the shaft. Here the oil passes directly to the rubbing surfaces between the hub halves and the shaft. Working both ways along the shaft the oil reaches the end recesses, D and E, where centrifugal force carries it outward to the ports F, and through them back to the reservoir. As the oil returns through all four ports F, the wings BB of the collar collect it and direct it to the holes CC. Thus a con-

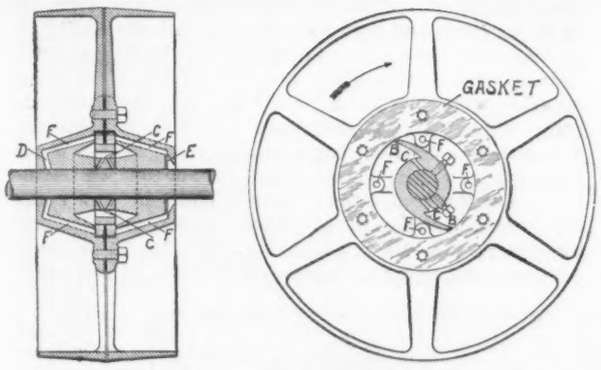


Fig. 3.—Axial and Cross Sections of the Maymont Pulley.

tinuous circulation of the oil is automatically maintained, insuring copious lubrication of the pulley.

The pulley is automatically and naturally non-leaking. The joint between the halves is made tight by the thin oil proof gasket. The only other way out is along the shaft and centrifugal force cuts off escape of oil at each end at the recesses D and E. Even when the pulley stops, the oil in ports F above the shaft will drain outward to recesses D and E and thence down around the shaft to the standing oil level.

New oil is fed in, with the pulley in motion, by inserting at the open end E of the pulley, where it at once enters the circulation with the old oil. The addition of a very little oil once a month will usually maintain the supply, as none escapes.

Slight alterations in construction make the pulley suitable for vertical shafts or mule stands. It, therefore, is adapted to service in any position or at any angle from horizontal to vertical. In no case, it is claimed, will it lose oil, either in motion or at rest. By reason of its positive and copious lubrication the pulley will work well and run cool at high speeds and under the strain of tight belts. It is guaranteed for satisfactory operation under such conditions.

Pulleys of small diameter are made in web style, as in Figs. 1 and 2. Larger sizes have spokes, as shown by Fig. 3. Every pulley is perfectly balanced and will run true. The ample and reliable lubrication reduces wear to a minimum, and looseness on the shaft comes only after long service. A sleeve may be used if desired, and then all wear on the shaft is prevented. If the pulley is applied to a worn or cut shaft a sleeve is advisable.

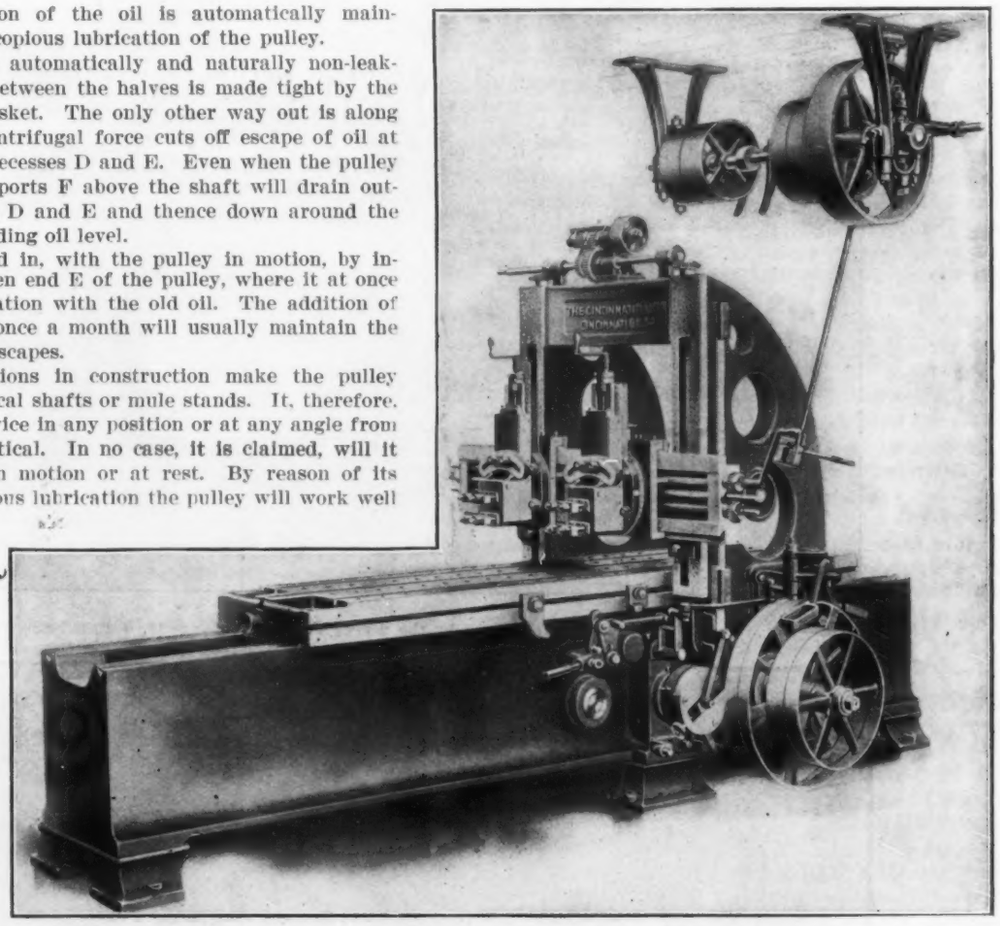
The pulleys are made in all standard sizes from 6 in. diameter by 3 in. face to 30 in. diameter by 14 in. face. Special heavy pulleys for tighteners on main drive belts are made to order.

Walter O. Amsler, engineer, Wabash Building, Pittsburgh, has been awarded a contract for the installation of five 36-in. combination and 40-in. air chamber reversing valves, to be used in the new open hearth plant of the Maryland Steel Company, Sparrows Point, Md. The valves are of a special design, and will weigh 45,000 lb. each.

The Cincinnati Two-Speed Planer Drive.

The manner in which the Cincinnati Planer Company, Cincinnati, Ohio, has arranged to meet the demand for more than one speed on a planer of relatively small size is shown in the accompanying illustration. The planer itself is the regular 30 x 30 in. x 8 ft. heavy pattern planer built by this company, but arranged in connection with the countershaft to give two cutting speeds and a constant return.

On the countershaft are two sets of pulleys, one pulley keyed to the shaft and the other, a wide-faced pulley, running loose on the shaft. The one keyed to the shaft is driven in the regular way by the tight pulley of the pair at the left in the illustration, and the wide-faced pulley is driven by another belt running from the line shaft to give a different speed. The loose wide-faced pulley and regular cutting pulley have the same diameter, so that the belt may be easily shifted from one to the other through the mechanism shown extending down to the side of the housing, where it is convenient to the hand of the operator. By operating the lever shown the shifter moves the belt to the right and on the cutting pulley, giving the regular high speed, and for a low speed the belt is shifted in the opposite direction to the wide-faced pulley. The return belt remains in one position, giving the constant return of the table, and is driven by the usual extra heavy return pulley, the largest of the pulleys shown on the countershaft.



A 30 x 30 In. by 8 Ft. Heavy Pattern Planer with Two-Speed Drive, Built by the Cincinnati Planer Company, Cincinnati, Ohio.

With this arrangement any two cutting speeds desired can be provided, and the changing from one speed to the other can be accomplished while the machine is running. The company recommends the use of the two-speed drive on all planers from 22 to 36 in., inclusive, and above these sizes the use of its standard speed box.

The Inland Steel Casting Company, Terre Haute, Ind., has just completed a new steel foundry 75 x 350 ft., with a core room 40 x 65 ft., fully equipped for making high grade crucible steel castings.

The New Model Star Lathe.

The line of 9 and 11 in. Star lathes made by the Seneca Falls Mfg. Company, 255 Water street, Seneca Falls, N. Y., have recently been redesigned. The accompanying Fig. 1 shows a No. 30-H Star lathe of 11-in. swing, 5-ft. bed, mounted on an oil pan. The following description of this lathe applies equally well to the 9-in. lathe.

The head spindle is made of 0.60 to 0.65 per cent. carbon crucible steel, and revolves in large ring oiling bearings. The spindle nose is threaded only part way to facilitate changing chucks and face plates, and is ground to size to insure accurate fit. Guards for the back gear have been added. The tailstock has been made heavier and stronger, with long bearings on the bed and face, and has side adjustment and an oil well.

The carriage has been strengthened and is provided with T slots. The cross feed screw and ways are particularly protected from chips and dirt by a guard the full length of the slide. The cross feed screw is supplied with a micrometer collar, graduated to read to thousandths of an inch, secured by a friction spring and readily set to any position. The carriage is arranged for taper attachment which can be applied at any time. A plain or compound rest may be used and are easily interchangeable, and a new binding device facilitates quick changes and rigidly binds the rest to the cross slide, which is graduated 180 degrees for setting the compound rest. The automatic cross and longitudinal feeds are actuated by a friction clutch and phosphor bronze worm receiving power from the head spindle through spur gears and the lead screw which is splined. The range for thread cutting is extremely wide; all standard threads, right and left, can be cut from 3 to 72 per inch, including 11½ and 27. Metric threads can be cut either by transposing gears with the regular lead screw or by using a screw having metric threads.

The change gears used on the lathe have rounded edges to avoid injuring the hands. The change gear yoke has an improved intermediate stud which is adjustable from the outer end, and all adjusting screws have a uniform size head to fit the tool post wrench. Patented split spring washers hold the change gears in place, and are convenient to operate and facilitate quick shifting. Screws, nuts and small parts likely to become bruised are case hardened. Cylindrical surfaces are ground, sliding surfaces hand scraped to a perfect bearing, and ample facilities are provided to compensate for wear. A full

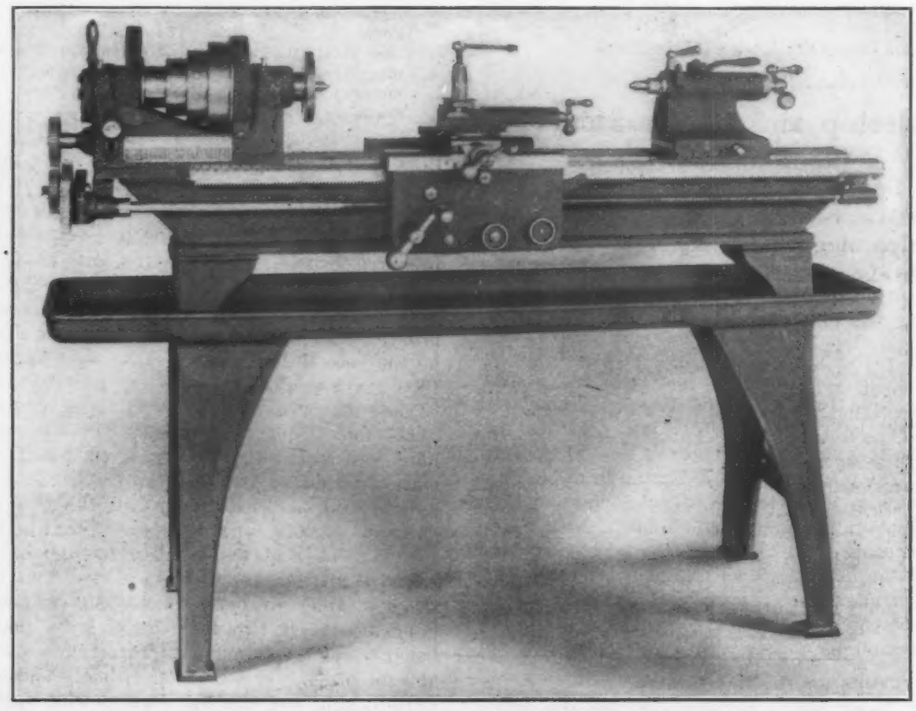


Fig. 1.—The No. 30-H 11-In. Star Lathe Built by the Seneca Falls Mfg. Company, Seneca Falls, N. Y.

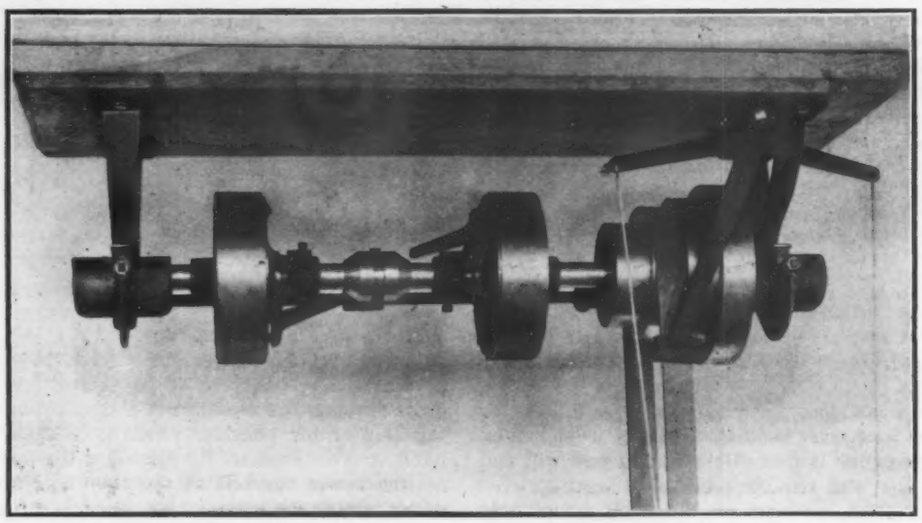


Fig. 2.—The New Countershaft with Cone Pulley Belt Shifter.

line of the conventional attachments may be used, which includes taper attachment, draw-in chucks and collets, automatic draw-in chuck and rod feed, milling and gear cutting attachments, blocking, automatic turret on bed, carriage turret, double tool block and stop for carriage which can be furnished at any time without special fitting.

A new countershaft, shown in Fig. 2, is furnished which has improved friction clutch pulleys and a large friction surface on the rim of the pulley. Wear on the friction parts when the pulley is running idle has been eliminated, and the usual countershaft troubles reduced to a minimum. The hangers have large ring oiling shaft bearings, and are adjustable for alignment. The cone belt shifter is a special feature. It acts quickly and is very convenient, especially with high ceilings.

Battleship and Armor Bids.

The Navy Department Opens Bids on Two Great Battleships and Their Armor—These Battleships Are to Be Larger Than Any War Vessels Thus Far Built.

WASHINGTON, D. C., August 22, 1909.—Bids were opened at the Navy Department on the 18th inst. for the construction of the two 26,000-ton battleships, Arkansas and Wyoming, and for the 12,984 tons of armor with which they will be protected. The law provides that only one of the two vessels may be built in a single yard. The William Cramp & Sons Ship & Engine Building Company, Philadelphia, Pa., was the lowest bidder, and the New York Shipbuilding Company, Camden, N. J., came next. The Carnegie Steel Company, the Bethlehem Steel Company and the Midvale Steel Company each bid $420 per ton for all armor of class A, constituting about 90 per cent. of the equipment, while they submitted varying bids for the remaining classes.

Bids for the Battleships.

Under the department's circular bids for the battleships were submitted in two classes, those in class 1 being based on the construction of hull and machinery in accordance with the plans and specifications provided by the department, while those in class 2 were presented on the alterative basis of hull and equipment on the department's plans with machinery designed by the bidder, or the entire vessel, including hull, equipment and machinery, constructed on the bidder's plans. The bidders and their proposals were as follows:

William Cramp & Sons Ship and Engine Building Company, Philadelphia, Pa.

A. Class 1: Hull and machinery, Department's plans; delivery within 32 months; speed 20.5 knots.... $4,450,000
B. Class 2: Hull and equipment, Department's plans; machinery, turbine-reciprocating engine type, bidder's design; delivery within 32 months; speed 20.5 knots..... 4,475,000

New York Shipbuilding Company, Camden, N. J.

A. Class 1: Hull and machinery, Department's plans; delivery within 32 months; speed 20.5 knots.... 4,675,000
B. Class 2: Hull and equipment, Department's plans; machinery, turbine-reciprocating engine type, bidder's design; delivery within 32 months; speed 20.5 knots..... 4,780,000
C. Class 1: Hull and machinery, Department's plans; delivery in 32 months; speed 20¾ knots..... 4,750,000
D. Class 2: Hull and equipment, Department's plans; machinery, turbine-reciprocating engine type; delivery within 32 months; speed 20¾ knots..... 4,875,000

Newport News Shipbuilding & Dry-Dock Company, Newport News, Va.

A. Class 1: Hull and machinery, Department's plans; delivery within 34 months; speed 20.5 knots..... 4,790,000
B. Class 2: Machinery, reciprocating engine type; delivery in 33 months; speed 20.5 knots..... 4,680,000
C. Class 2: Machinery, reciprocating engine and Parsons turbines; delivery in 36 months; speed 20.5 knots 5,010,000

Fore River Shipbuilding Company, Quincy, Mass.

A. Class 2: Hull and equipment, Department's plans; machinery, Curtis turbines; delivery within 33 months; speed 20.5 knots..... 4,797,000
B. Class 2: Hull and equipment, Department's plans; machinery, turbine engines; delivery within 33 months; speed 20.5 knots..... 4,747,000
C. Class 2: Hull and equipment, Department's plans; machinery, Curtis turbine engine; delivery within 33 months; speed 20.5 knots..... 4,922,000
D. Class 2: Hull and equipment, Department's plans; machinery, Curtis turbines; delivery within 33 months; speed 20.5 knots..... 4,846,000
E. Class 2: Hull and equipment, Department's plans; machinery, Curtis turbine coupled with reciprocating engine; delivery within 33 months; speed 20.5 knots..... 4,947,000
F. Class 2: Hull and equipment, Department's plans; machinery, Curtis turbine coupled with reciprocating engines; delivery within 33 months; speed 20.5 knots..... 4,876,000
G. Class 2: Hull and equipment, Department's plans; machinery, Curtis turbine, coupled with electric motor; delivery within 33 months; speed 20.5 knots 5,097,000
H. Class 2: Hull and equipment, Department's plans; machinery, Curtis turbine, coupled with electric motors; delivery within 33 months; speed 20.5 knots 5,027,000

The various alternative bids submitted will be carefully examined by the department before the awards are made.

The Arkansas and Wyoming will be the largest war vessels ever built, and, according to a semiofficial statement prepared by the Navy Department, naval constructors all over the world are following the development of their plans and construction with interest. The nearest approach to these vessels in displacement and power will be the second four of the eight new battleships of the 1909 naval programme of Great Britain, which will not be laid down until next April, and which will be of 24,000 tons displacement each. The Arkansas and Wyoming will mount 12 12-in. guns, each 50 ft. long, or two more than either the Utah or Delaware type. The Arkansas and her sister ship will have a displacement, however, of 6000 tons in excess of that of the Delaware type, while the displacement of the British Dreadnought is but 17,900 tons, or more than 8000 tons under that of the new American battleships. The Arkansas and Wyoming also carry two more heavy rifles than the Dreadnought, and on account of turret arrangement will be able to fire the entire 12 on either broadside, while the Dreadnought can fire but eight, owing to the fact that two of its turrets are so masked that two of the guns can be trained to one broadside only.

Bids for the Armor.

The action of the Carnegie, Bethlehem and Midvale companies in submitting identical bids on class A armor was no surprise to the department, as this course was pursued by the same bidders when proposals for the last armor contract were received. The variations in the bids on armor of classes B to E, the quantities of which range from 910 tons down to 98 tons, are supposed to have been made with a view to distributing these types of armor in accordance with the facilities and engagements of the three concerns. The bids in detail are as follows, the quantities being stated but once:

Carnegie Steel Company, Pittsburgh, Pa.

Class A armor, $420 per ton for 11,486 tons; class B, $420, for 910 tons; class C, $460, for 360 tons; class D, $600, for 130 tons; class E, $600, for 98 tons. Deliveries to begin within six months of contract, and to continue at the rate of 600 tons per month.

Bethlehem Steel Company, South Bethlehem, Pa.

Class A, $420; class B, $418; class C, $470; class D, $587; class E, $508. Deliveries to begin on or before February 18, 1910, and to continue at the rate of 600 tons per month.

Midvale Steel Company, Philadelphia, Pa.

Class A, $420; class B, $415; class C, $470; class D, $590; class E, $512. Deliveries to begin on or before February 18, 1910, and to continue at the rate of 600 tons per month thereafter. W. L. C.

The Sloan & Chace Mfg. Company, Newark, N. J., has been awarded contract for supplying the Census Bureau, Washington, D. C., with 100 tabulating machines at $478 each and 300 punching machines at $250 each. The machines are to be used in compiling the statistics of the next census returns.

THE IRON AGE

Established in 1855.

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RICHARD R. WILLIAMS, - - - - - - - - HARDWARE EDITOR.

The Lake Ore Movement in 1909.

Estimates made early in the season of the amount of Lake Superior ore to be brought down in 1909 are again being revised. Shippers were disposed to say four or five months ago that a total of 35,000,000 gross tons was likely. This estimate was raised a month or two ago to 38,000,000 tons, and to-day some in the ore trade are willing to predict that 40,000,000 tons will be brought down. In spite of the strike of labor on lake vessels there is no question as to the ability of the ore fleet to reach 40,000,000 tons, if there is smooth operation of the ore transporting and handling machinery through the balance of the season. July, with a number of interruptions, showed a total of 6,693,025 tons, and the estimates for August are around 7,000,000 tons. If the latter figure is reached the shipments to September 1 will be about 22,400,000 tons. A movement of 7,000,000 tons in each of the two following months and of 4,000,000 tons in November would bring the total above the 40,000,000-ton mark.

The controlling factor will be, therefore, the probable requirements of the furnaces consuming Lake Superior ores. So far as the Eastern furnaces are concerned they have not been to the same measure dependent upon lake ores this year as in some previous years, importations having been quite brisk in the past two or three months, with promise of further heavy shipments from abroad through the remainder of the year. The United States Steel Corporation, which has generally shipped about 55 per cent. of the Lake Superior output, is expected to bring down at least 20,000,000 tons this year, and the figure may go to 21,000,000 tons. On that basis, if a 40,000,000-ton total is reached, the independent shippers will bring down somewhat more than their proportion of recent years. So far as the Minnesota ore roads of the Steel Corporation are concerned, their schedules for this year contemplate shipments equal to the record total made in 1907.

It is not new to have a revision upward of early estimates of lake ore shipments. Changes in the iron trade between April and August have at times been abrupt. It may be remembered that in 1904 some of the firms at Cleveland with good opportunities to know the conditions estimated before the opening of navigation that not more than 14,000,000 or 15,000,000 tons of ore would be shipped. The total turned out to be 21,849,401 tons, including all-rail shipments of 600,000 tons to Lake Superior, Milwaukee and Chicago district furnaces. In the following year, 1905, a new record was made with a total of 34,384,116 tons, or nearly a 60 per cent. increase over 1904. The shipments of 1908 were 26,014,987 tons. Even at 40,000,000 tons for 1909 the increase over last year would not be so marked as that of 1905 over 1904, for 1904 saw no such sheer drop from the production of 1903 as that of 1908 from the high record made in 1907. For the most part, 1908 in the iron trade was a 60-per cent. year, as compared with the high level of 1907. The indications at the beginning of this year were that it would show an output about 80 per cent. of the record for 1907. In pig iron indications now point to an output between 90 and 95 per cent., and in lake ores quite 95 per cent. of that in 1907.

The Steel Industry and Concrete Reinforcement.

The demand upon the steel industry through the marked expansion in the use of concrete in the past few years has been greater than is commonly known. It is a surprise to those who are closest to it. In June a number of important bar mills made the largest output in their history, and in July the June figures were exceeded. That such records are made at a time when iron and steel mills, as a whole, are still somewhat under their highest aggregate production is due to the heavy demand for bars for concrete reinforcement. At some bar mills, indeed, from one-fourth to one-third the production in recent weeks has gone into concrete work.

This condition is in marked contrast with that of four or five years ago, when leading steel manufacturers were making up their minds whether it would be profitable to adapt their operations to this new trade. There were some departures from the well established lines of the merchant bar trade. In contrast with the standard lengths of merchant bars that made possible record breaking outputs by the continuous bar mills installed after the nineties were the diversities in length of the reinforcing bars; the carbon and physical requirements represented other departures from merchant bar practice, and in the case of the twisted, corrugated and various special forms, the cutting of rolls and the work subsequent to the rolling involved not only expense, but limitations on tonnage which ran counter to the ambitions of mill managers for new records. But the period of experimenting and sifting has now been traversed and the steel companies, from looking somewhat askance at the new development, partly for the reasons given and partly because of the general impression that structural steel would suffer from the advance of concrete, now recognize that the latter has become an important ally.

The time was when reinforced concrete construction, especially in buildings, was looked upon as replacing a certain tonnage of structural shapes, that might have been employed for cage construction, by a comparatively small amount of bars. It is now appreciated that the expansion of concrete has been rather at the expense of wood, brick and stone. While it is true that the steel used in reinforced concrete buildings amounts to but about 40 per cent. of the structural shapes that would be needed for a steel frame for a building of similar size, the large part of the increase in concrete building is in cases where the cost of steel cage construction would either be prohibitive or would mean the erection of a smaller building. There is to be considered also the important addition made to the output of certain sheet and wire mills by the introduction of wire mesh, steel lath and the various other forms of sheet metal employed in wall and floor construction. Concrete work, in fact, has contributed to the steel trade in the past two

years to an extent compensating far more than has been appreciated for the pinching off of steel consumption by the railroads.

The Maximum Tariff Clause.

Manufacturers who are seeking to broaden their export trade will await with considerable interest the application of the second section of the new tariff. There has been much complaint that American products like machine tools and agricultural implements pay higher duties in many foreign countries than similar goods imported from "favored" countries, and the maximum clause in the new law is offered as a remedy for this difficulty.

In the earliest tariffs enacted by Congress it was provided that goods imported into this country in foreign ships should pay a discriminating or "maximum" duty 10 per cent. higher than similar imports in American vessels. This was designed to favor and protect American shipping interests, and has appeared in every tariff law during the past century, having been re-enacted in Section 15 of the present law. At an early period, however, this provision was set aside by commercial treaties which were negotiated with the principal countries of the world. European nations had adopted the same principle in their tariffs, but made treaties in which they set aside the discriminating duties, and the United States entered into this general scheme of reciprocal maritime treaties.

The first effort in this country to adjust tariff duties on a basis that would promote markets for exporting industries was in the McKinley tariff of 1890. That law placed raw sugar, coffee and certain other products on the free list, but gave to the President executive discretion to negotiate "conventions" or informal treaties with other countries, and to enforce certain duties on the articles named unless the countries from which these articles were imported would make concessions to the United States in their tariffs on American products. The President was not authorized to make any concessions from the regular schedules of the McKinley law, but was merely given discretion to refrain from imposing these "maximum" duties. Under this law Secretary Blaine negotiated conventions with Germany and several Latin-American countries, the concessions obtained being chiefly on American foodstuffs. These conventions were abrogated by the Wilson tariff before they had shown any notable result in extending foreign markets.

The Dingley tariff contained three distinct schemes of reciprocity. The third section authorized the President to make certain specified reductions in duties on brandies, wines, argol, art works and other enumerated articles in favor of any country that would offer reciprocal concessions to the United States. Conventions were negotiated promptly under this law with France, Italy, Portugal and Germany, and these conventions have remained in effect until the present time, but will be terminated by the new law. These conventions have proved fairly satisfactory in keeping foreign markets open for the products favored by them, but have been of limited scope, as they covered only meats and other food products and petroleum.

The third section of the Dingley law also provided "maximum" duties on coffee and a few other tropical products, which the President might impose at his discretion; these articles to remain on the free list unless executive action was taken. No definite results came from this clause, as it is a very disagreeable step and not in harmony with modern diplomacy for a President to enforce arbitrary, discriminating duties against one country or a group of countries.

The fourth section of the Dingley act, embodying the third distinct plan of reciprocity in that law, authorized the President to negotiate treaties with other countries, and to make concessions in such treaties of not more than 20 per cent. of any or all of the regular duties in the tariff. It was provided, however, that such treaties should be negotiated within two years, and should be ratified by the Senate and approved by the House of Representatives. President McKinley directed the negotiation of 12 treaties under this section, but none of them was ever ratified by the Senate. The treaty with France was the only one ever reported to the Senate for action, and it did not come to a vote. The treaty with Cuba was not created under any special authority given by the Dingley law, but was taken up under the general power of the President to negotiate treaties.

The second section of the Payne tariff is a broad extension of the principle embodied in the McKinley tariff and the dormant clause in the third section of the Dingley act. It does not authorize any concessions from the rates fixed in the law, nor does it authorize any diplomatic consideration or *quid pro quo* for concessions that may be granted to the United States by other countries. It provides that from and after March 31, 1910, the tariff of the United States shall be 25 per cent. ad valorem higher than the rates now in force, unless the President shall publish in favor of each country a proclamation that such country does not "unduly discriminate" against American products.

The only countries which discriminate in their tariff duties against the United States do so by virtue of treaties which they have negotiated with the nations so favored, and these treaties are all founded upon and embody mutual concessions. American diplomats and Secretaries of State have long held to the doctrine that when two countries favor each other by mutual concessions in a treaty, it is not undue discrimination against a third country which has made no concessions and is not a party to the reciprocal compact. Without overturning this cornerstone of American diplomacy it will be impossible for the President to find any undue discrimination in the favors which other countries grant to each other by reciprocal treaties. If this view of the facts is correct, the much discussed maximum clause of the new tariff will prove a disappointment to the exporting interests which have favored it.

The German tariff contains a dormant retaliatory clause which authorizes that government to double its rate schedules, by ministerial decree, on products from any country which discriminates against German products and to levy duties of 50 per cent. on articles that are otherwise admitted free. This, however, was a mere reserved power in the German law, and has never been used, but it is suggestive of the trouble that might arise if discriminating duties should be imposed against Germany. The fundamental feature of the modern tariff policy of Germany and other countries which have adopted the reciprocal policy is to offer mutual concessions. All the German treaties embody reductions from the general tariff rates in favor of the country which is a party to the treaty. Other countries, however, have in reserve the same retaliatory feature which is found in the German law. Our new law has the retaliatory clause without the reciprocal foundation of recent European tariffs.

The retaliatory or maximum rate fixed in the Payne law may prove an additional embarrassment to the Pres-

ident in making any diplomatic use of this feature of the tariff. The rate is 25 per cent. ad valorem. The present duty on pig iron is $2.50 per ton, but on imported pig iron valued at $20 per ton the maximum or retaliatory rate would be $5 additional. In the fourth section of the Dingley law the concession authorized was 20 per cent. of the schedule duty, or 10 per cent. ad valorem, where the duty was 50 per cent. The average of the concessions granted to France in the treaty which failed of ratification was only 3 per cent. ad valorem. The concessions granted by European countries in their reciprocal treaties seldom exceed 5 per cent. ad valorem. A general retaliatory duty of 25 per cent. ad valorem is therefore a very formidable addition to the schedules now in force, and its drastic character will prove a serious obstacle to any diplomatic use of it, even if it were not qualified and made harmless by the word "unduly."

Boiler Explosions Seldom Caused by Bad Steel Plates.

In the course of a discussion of the quality of steel plates at the recent convention of the American Boiler Manufacturers' Association, held in Detroit, President E. D. Meier of that association, who is also president of the Heine Safety Boiler Company, St. Louis, made a most interesting statement. He said that in the course of an investigation of boiler casualties, which he had made some years ago, based on reports of boiler explosions given in a publication issued by the Hartford Steam Boiler Inspection & Insurance Company, he had divided them into groups according to causes of explosions and also as to localities. To his amazement he had found that the explosions in country districts far exceeded those in cities, the rate being 40 to 1, and this was the case even before the present days of inspection ordinances in cities. He also found that as a rule the character of the steel had very little to do with the cause of the explosions, although, of course, if the sheet was defective there would always be present danger of explosion from that cause. The trouble was due more to the want of competent men to handle the boilers. As to bad calking, he remembered only one instance, that of the Acushnet explosion, and a study of that had convinced him that the trouble was even there due more to another cause—namely, that the sheets had not been properly laid on each other. Most of such matters, he said, can be met by proper inspection.

Steel plate manufacturers have always contended that they should not be held responsible for boiler explosions, inasmuch as these can occur from a variety of causes apart from the quality of the material entering into the construction of the shell. They will be pleased to have testimony of this character from such a competent authority as President Meier.

The new British patent law, a consular report says, is looked upon with much dissatisfaction in Germany. It is stated that the large majority of German patent holders will try to sell their patent rights in the United Kingdom to British companies, while only a very small minority may erect works of their own in the United Kingdom.

Niles Furnace of the Carnegie Steel Company at Niles, Ohio, is being prepared for blast and will be started at an early date. The stack is comparatively small, having a daily capacity of about 250 tons. The pig iron output of the company is now nearly up to the available capacity.

CORRESPONDENCE.

The Prevention of Waste in Manufacturing.

To the Editor: Your editorial of August 19 describing the benefits derived from a constant comparison of previous and current costs leads me to think that your readers may be interested to know that this idea has been developed to a far greater extent with corresponding profit. The lowest cost which happens under ordinary conditions is by no manner of means the lowest possible cost. It has been repeatedly found that there is generally a great but preventable waste of time, which is unrealized by either employer or employee, often to the extent of 40 per cent. The amount of this waste, together with the cause and the remedy, can be determined by a proper analysis of the operative motions and the time taken in performing them. It is then possible to determine quickly a reliable standard time or cost for the remaining operations. A proper use of these standards has often resulted in an increase of over 67 per cent. in the output and a correspondingly large decrease in the net total unit cost of the product. Indeed, I know of cases where this record has been very greatly surpassed in concerns which supposed that the productive capacity of their plant had been fully developed.

While these methods of increasing the output and decreasing cost are in successful operation in some of the largest corporations and manufacturing plants in the country they are not at all known to cost accountants, but only to those engineers who have made a special study of the possibilities of improvement in this direction.

H. F. STIMPSON.

1 MADISON AVENUE, NEW YORK, August 20, 1909.

The New Duty on Pliers and Nippers.

To the Editor: In *The Iron Age* of August 12, giving the changes of duty under the new tariff on the metal schedule, the facts are stated clearly as to pliers and nippers, but it seems to me that some comment as to the effect of this change in duty would be of interest and value to your readers.

Those familiar with this line of business are perhaps aware of the fact that weight and value have but little direct relation, and that this specific duty of 8 cents per pound, which appears very innocent on the face of it, really makes a very material change in the cost of imported pliers, and more especially so on the cheaper grades. On many items the equivalent ad valorem rate under this new duty is upward of 150 per cent. Many of the cheap pliers and nippers, which have heretofore been imported and which are not manufactured in this country, are practically excluded, and on others the selling price here must be advanced to such an extent that it is very doubtful whether the trade and the consumer will continue to purchase them. This particular schedule is one of the most pernicious "jokers" in the tariff bill.

If reference is made to the *Congressional Record*, it will be found that this paragraph, which at that time was No. 194½ of Senate Amendments, was adopted by the Senate with practically no debate and under the statement by Mr. Aldrich that it was an unimportant item. In conference the specific duty was reduced from 10 cents to 8 cents per pound, but this slight reduction in the specific rate is of practically no importance or value in reducing the net result of the schedule as finally adopted.

W. M. TAUSSIG, President,
WIEBUSCH & HILGER, LTD

NEW YORK, August 23, 1909.

There has been no further trouble at the plant of the Pressed Steel Car Company at McKees Rocks, Pittsburgh, since last Sunday night, at which time a conflict occurred between the strikers and the State constabulary in which six or seven men were killed and a large number injured. The company claims to be steadily increasing the number of men at work, and says that in a short time the plant will be running practically full. The number of guards at the plant has been enlarged, however, so as to handle further outbreaks if necessary.

PERSONAL.

Charles T. Fairbairn, manager of the Lake Superior iron mines of the Republic Iron & Steel Company and one of the best known mining men in the Lake Superior District, has been promoted to the position of general manager of the corporation's mines. The company has iron mines in the South and coal mines in the East, in addition to its several Lake Superior properties, and Mr. Fairbairn will have charge of all of them. His new duties will take him to Pittsburgh. He has been located in Duluth for some time, but much of his work has been done on the Mesaba and Marquette ranges.

E. W. Acker, until recently connected with the Brown Hoisting Machinery Company, Cleveland, is now employed by the Liggett Spring & Mfg. Company, whose works are at Axleton, near Monongahela, Pa., as engineer, his work dealing more directly with chemistry and metallurgy.

R. G. Keddel has recently joined the Board of Directors of John George & Sons, Ltd., American merchants, London.

J. V. W. Reynders, vice-president of the Pennsylvania Steel Company, who has been in Europe for several months, is now on his way home and is due to arrive in New York August 29.

Frank Beemer, who for a number of years has been general superintendent of the Standard Roller Bearing Company, Philadelphia, has resigned, and has been elected vice-president and general manager of the Becker Steel Company, the American branch of the Stahlwerk Becker, Germany, which manufactures high carbon tool steel tubing, chrome steel tubing, as well as high speed steel and various other crucible steel products. Its office is in the Land Title Building, Philadelphia.

Alexander K. Mischkay, an engineer representing the Russian Government, is in the Central West examining new types of bridges and viaduct and culvert construction.

E. W. Edwards, president of the Edwards Mfg. Company, Cincinnati, Ohio, has returned to business from a summer spent in the Snow Islands, Michigan. Mr. Edwards, his wife and their daughter barely escaped with their lives in the fire which destroyed the Hotel Hessel on the morning of August 10. Several months ago they had an equally thrilling experience in the fire which destroyed the Clarendon Hotel at Seabreeze, Fla.

Charles M. Power, secretary and general manager of the Seneca Chain Company, Kent, Ohio, has resigned and will go to Pittsburgh October 1 to become general sales manager of the Standard Chain Company.

John Fritz passed his eighty-seventh birthday August 21 at his home in Bethlehem, Pa., receiving many congratulatory telegrams and cablegrams from prominent engineers and manufacturers.

William H. Lindsey, Nashville, Tenn., who has served in various positions in connection with the several companies hereafter named, is now vice-president of the Napier Iron Works, Crescent Coal Company and president of the Dealers' Fuel Company, all known as Cole and Washburn interests. His advancement has been unusually rapid for a man only 31 years old.

J. A. Rawlins of Naylor & Co., New York, sailed for Europe recently.

D. E. Woodbridge, Duluth, Minn., sailed on the Mauretania August 25 and will visit a number of iron ore properties in Europe.

Severn P. Ker, vice-president and general manager of sales of the Republic Iron & Steel Company, has resigned, to take effect October 1. Charles T. Johnston, assistant general manager of sales, will succeed Mr. Ker as general manager of sales. George L. Claypool, at present manager of sales of the Pittsburgh District, will succeed Mr. Johnston as assistant general manager of sales, and Walter W. Hall, assistant in the general sales office will succeed Mr. Claypool as manager of sales in the Pittsburgh District. These appointments all become effective as of October 1.

Severn P. Ker, at present vice-president and general manager of sales of the Republic Iron & Steel Company, having acquired a large interest in the stock of the Sharon Steel Hoop Company, will on October 1 become associated with the Sharon Steel Hoop Company, in the capacity of general manager. On assuming this position Mr. Ker will be located at the general office of the Sharon Steel Hoop Company, at Sharon, Pa. It is the purpose of this company to broaden its field of operations and to develop particularly in the line of high grade specialties. Mr. Ker was invited into the organization because of his long experience in connection with the manufacture of high grade steel specialties, acquired during his 15 years' connection with the firm of Smith Brothers & Co., later the La Belle Steel Company, at their plant in lower Allegheny, which, upon the organization of the Crucible Steel Company of America, was merged into that company.

David N. Carlin of the sales department of the Thomas Carlin's Sons Company, N. S., Pittsburgh, sailed for England last week. He will visit Wales and Scotland and will be absent two months.

OBITUARY.

RILEY MILES GILBERT, formerly of King, Gilbert & Warner, Columbus, Ohio, and afterward vice-president of the National Steel Company, died at his summer home, Bolton's Landing, Lake George, N. Y., August 22, aged 61 years. Mr. Gilbert was one of the successful iron and steel manufacturers of the old school. He was born in Ireland and came to the United States as a boy. His earliest connection with the iron trade was in the sale of the product of the Cherry Valley Iron Works, Leetonia, Ohio, in the early seventies. He formed in the early seventies the firm of King, Gilbert & Warner, Columbus, Ohio, which sold pig iron, bar iron and other products for a number of southeastern Ohio producers. Later the company owned the Standard Nail Company, Middletown, Ohio, and the Moxahala Furnace in the Athens District, and in the eighties engaged in pig iron manufacture at Columbus. Its two furnaces and the connected steel works were taken over by the National Steel Company on the organization of the latter company in 1899.

FRANK Q. BARSTOW, East Orange, N. J., died suddenly August 19 on a railroad train near Utica, N. Y., on his way from the Thousand Islands to New York. He was born in Waukesha, Wis., and was 62 years old. For more than 30 years he had been a director of the Standard Oil Company. He was also a director of the Thompson-Starrett Company, Railway Steel Spring Company, Corn Products Refining Company, Hegeman & Co., New York Glucose Company, Union Tank Line Company, Savings Investment & Trust Company, the People's Bank and the East Orange Bank. He leaves a widow and two sons.

WILLIAM GRUENDLER, St. Louis, Mo., president of the Gruendler Machine Company, died recently after an illness of 10 months, aged 54 years. He was born in Culm, Germany, and came to this country in 1880. He was engaged in the machinery business for the past 28 years. He leaves a mother, widow, two daughters and one son.

WILLIAM T. JOHNSON died at his home in Chicago from heart disease August 8, aged 74 years. He was born in Westmoreland, N. Y., and in 1853 went to Chicago, becoming connected with the Mason Iron Works. In 1864 he withdrew and established the Phœnix Iron Foundry, closing it out a few years later to enter the hardware firm of Kellogg, Johnson & Bliss, which for a long period held a prominent position among the commercial establishments of the city. In 1878 he was elected to the State Senate of Illinois, where he served until 1880, when he became treasurer of Cook County. He was appointed on the State Railroad Commission by Governor Oglesby in 1884, and was Indian Commissioner under President Garfield. He leaves a widow and two daughters.

The Republic Iron & Steel Company.

The tenth annual report of the Republic Iron & Steel Company, which covers operations for the fiscal year ending June 30, 1909, makes a much better showing than had been expected when the fiscal year opened. The income account for the year makes the following comparison with the previous fiscal year, ending June 30, 1908:

	1909.	Changes.
Gross profits	*$2,769,147	Dec. $1,277,542
Depreciation, interest, discount, &c.	726,322	Dec. 1,348,947
Net profit	$2,042,825	Inc. $71,405
Bond interest	413,479	Inc. 413,479
Preferred dividend	408,338	Dec. 663,549
Surplus	$1,221,008	Inc. $321,475
Previous surplus	4,699,527	Inc. 899,534
Total surplus	$5,920,585	Inc. $1,221,009

* Gross profits after deduction of $887,654 for maintenance and repairs of plants.

The balance sheet, as of June 30, 1909, makes the following showing:

Assets.

Cost of properties		$54,558,375.36
Permanent investments:		
In Potter Ore Company	$401,000.00	
In associated companies owned or controlled	160,000.00	
In other companies	406,335.70	
		967,335.70
Total capital assets		$55,525,711.06
Cash deposited with trustees:		
For the redemption of first mortgage bonds (in addition to bonds of a par value of $1,889,000 canceled in term of the trust deed, per contra)		3,804.94
Current assets:		
Inventory of manufactured product, materials and supplies on hand at or below cost	$4,558,512.54	
Ore contract payments represented by ore at docks	720,884.57	
Advance to associated companies	216,886.36	
Accounts and bills receivable after deducting reserve for bad and doubtful accounts	2,828,935.86	
Cash	1,630,144.98	
Total current assets		9,955,364.31
Deferred charges to operations:		
Expenditure for stripping at mines, advanced mineral royalties, &c., chargeable to future operations		849,341.21
Total		$66,334,221.52
Net current assets	$7,809,901.12	

Liabilities.

Capital stock:		
Common—273,520 shares	$27,352,000.00	
Less in treasury	161,000.00	
		$27,191,000.00
Preferred—208,520 shares	$20,852,000.00	
Less in treasury	435,100.00	
		20,416,900.00
Total outstanding capital stock		$47,607,900.00
First mortgage bonds:		
Bonds issued	$10,000,000.00	
Less deposited with trustees and canceled	$1,889,000.00	
Purchased and held in treasury	17,000.00	
	1,906,000.00	
		8,094,000.00
Potter Ore Company bonds:		
$677,000 outstanding bonds guaranteed jointly with the Tennessee Coal, Iron & Railroad Company, less that company's proportion		338,500.00
Total capital liabilities		$56,040,400.00
Funds:		
Exhaustion of minerals	$906,322.02	
Depreciation and renewal of plants	706,413.00	
Relining furnaces	120,856.89	
Fire and accident insurance, &c.	290,463.31	
Contingencies	203,767.96	
		2,227,823.18
Current liabilities:		
Accounts and bills payable	$1,496,957.29	
Ore contract balances representing cash received in excess of the value of ore shipped to customers	60,058.42	
Taxes accrued	76,188.73	
Interest accrued on first mortgage bonds	101,175.00	
Dividends payable:		
2 per cent. on preferred stock, payable July 1, 1909	$408,338.00	
Unclaimed dividends	2,745.75	
	411,083.75	
Total current liabilities		2,145,463.19
Surplus:		
Balance June 30, 1909		5,920,535.15
Total		$66,334,221.52

Chairman Topping's Report.

From the accompanying information submitted by Chairman John A. Topping, the following extracts are taken:

During the year ended June 30, 1909, income was not only affected by labor troubles of a serious character, but by a period of low prices and a restricted volume of business. Prices of all products steadily declined throughout the year, with the average for May at the bottom, so that the period covered by the report was a period of business depression seldom, if ever, exceeded in severity. The general average volume of all products sold during the year was, approximately, 62 per cent. of normal, but notwithstanding the small volume of business the general cost of production was the lowest for the period in the history of the company, although labor rates were in excess of the company's minimum record.

The total appropriation and expenditures for maintenance and depreciation for the year were $1,613,976, as compared with $1,637,969 for the previous year. After making all necessary provisions for the company's various funds, including bond interest, the net profit from operations applicable to dividends was $1,629,346.

In view of the profits shown, the improved business prospects, and with the net working assets now at $7,809,901, as against the mortgage provision of $6,500,000, the Executive Committee felt warranted in not only resuming the regular quarterly dividend on the preferred stock, but also in declaring, payable in installments of 1 per cent. the dividend accumulated to July 1, 1909, of 7 per cent. on the preferred stock.

After making provision for the July 1 dividend, the net amount of profits carried to surplus is $1,221,008. The total of undivided profits now is $5,290,535. There has been no change in respect to the company's accounting methods, or in the policy of making full provision for the general physical maintenance of the property, or maintaining its financial strength, quick convertible assets being now $9,955,364, while the total of current liabilities is $2,145,463.

The gross volume of business shows a small increase as compared with that of the year 1908. A comparison of the gross value of business transacted for the past four years follows:

Year ended June 30, 1906	$26,193,439
Year ended June 30, 1907	31,227,423
Year ended June 30, 1908	18,693,882
Year ended June 30, 1909	19,595,944

The pig iron production was the largest in the history of the company, being 678,799 gross tons for the year, as compared with 494,676 tons in 1908, 614,954 tons in 1907 and 493,344 tons in 1906.

The production of finished and semifinished products during the year was 565,151 tons, as compared with 434,435 tons in 1908, 804,360 tons in 1907 and 742,435 tons in 1906.

The ore production was 1,451,434 tons for the year, as compared with 1,025,460 tons in 1908, 947,069 tons in 1907 and 970,106 tons in 1906. The company has added 1,156,005 tons to its ore reserves in addition to the year's production.

The unfilled orders for finished and semifinished products amount to 392,420 tons, as compared with 283,743 tons at June 30, 1908. The unfilled orders for pig iron amount to 94,247 tons, as compared with 59,196 tons in 1908, 74,500 tons in 1907 and 74,607 tons in 1906.

New Products.

No change was made during the year in the diversity of the company's products, which now consist of merchant bars, light structural shapes, spikes, bolts, nuts, shafting, turnbuckles, sheet and tin bars, billets and pig iron, but the Executive Committee has unanimously approved of plans recommended by the executive officers to further diversify the products by the manufacture of steel and iron pipe and for an increased steel capacity.

To carry out the plans of the management for the manufacture of steel and iron pipe, the Haselton Steel Tube Company was organized by friendly interests, and bought from the Republic Company its Haselton land, and also bought additional property, making total acreage about 107 acres; and to provide money to build the tube works and for working capital, issued $1,500,000 of notes secured by mortgage upon its property owned and to be acquired, which were sold, with the guaranty of the Republic Company, at 97½ per cent. net. The Republic

Company in this connection obtained an option to purchase at its convenience all the stock of the Tube Company at par and 6 per cent. interest, less any dividends paid. The Republic Company has entered into a lease with the Tube Company, provision being made for construction of plant and operation by the Republic Company for all profits against payment of 6 per cent. interest on cash capital actually paid in, interest on bonds, taxes, &c. To provide means for carrying out plans for increased steel capacity or other purposes, a sale of unissued preferred stock has been arranged.

Pursuant to these financial plans, there is now under contract the construction work necessary for the completion of one 10-in. continuous skelp mill, one 20-in. semi-continuous skelp mill, one 60-in. reconstructed sheared plate mill, two lap weld pipe mills and two butt weld pipe mills. The capacity of the new tube works is estimated at 100,000 tons annually.

The Lake Superior Mining Institute.

The programme for the meeting of the Lake Superior Mining Institute on the Marquette range, Wednesday, Thursday and Friday, August 25 to 27, calls for rendezvous at Ishpeming, Mich., Wednesday morning, a special train being taken from that point at 10.30 over the Duluth, South Shore & Atlantic Railway to the Maas mine at Negaunee. It was planned to devote Wednesday afternoon at Ishpeming to recreation and to hold a session there for the reading of papers Wednesday evening. On Thursday morning the party goes by special train over the Lake Superior & Ishpeming Railway to Negaunee and Marquette, the first stop being made at the Queen group of mines. Later Pioneer Furnace No. 2 at Negaunee, where a Gayley dry air plant has been installed, will be visited, and the latter part of the forenoon will be spent at the Lake Shore Engine Works, Marquette, lunch being served by the management of the plant. An afternoon trip to Munising is planned, and a business session will be held in the Alger County Court House in the evening. Friday morning's programme provides for visits to Grand Island and to the paper mill, veneer works, cooperage plant and other industries. The afternoon will be spent at Princeton, Mich., where the new mines of the Cleveland-Cliffs Iron Company will be visited. These consist of the Austin, Princeton and Stephenson mines, now operating, and the Smith mine developing. The concrete shaft at the Kidder mine will also be inspected. The list of papers for the meeting is as follows:

"How Reforestation May Be Applied to the Mine Timber Industry," by Thomas B. Wyman, Munising, Mich.

"Mine Accidents," by John T. Quine, Ishpeming, Mich.

"The Sociological Side of the Mining Industry," by W. H. Moulton, Ishpeming.

"Biographical Notes," by J. H. Hearding, Duluth, Minn.

"Reminiscences of the Early Days on the Marquette Range," by George P. Cummings, Marquette, Mich.

"Historical Sketch of Copper Mining on Lake Superior," by Alfred Meads, Marquette.

"Code of Mine Signals, Cleveland-Cliffs Iron Company," by O. D. McClure, Ishpeming.

"Capillary Attraction in Diamond Drill Test Tubes," by J. E. Jopling, Ishpeming.

"Sinking Reinforced Concrete Shafts Through Quicksand," by Frederick W. Adgate, Chicago.

"A Diamond Core Section of the Mesaba Rocks—No. 1," by N. H. Winchell, Minneapolis, Minn.

"Wood Preservation, with Especial Reference to Mining Timbers," by John M. Nelson, Jr., Washington, D. C. (U. S. Forest Service).

"Iron Ore and the Tariff," by H. Olin Young, Ishpeming.

The Algoma Steel Company Sells Its Mesaba Mine.—Oglebay, Norton & Co., Cleveland, Ohio, recently bought from the Algoma Steel Company, Ltd., Sault Ste. Marie, Ont., the iron mine on the northeast quarter of section 16-58-19, Mesaba range, Minnesota, and have organized the Woodbridge Mining Company to operate the property. A shaft is now being sunk and mining will be done for shipment next year. About 3,000,000 tons of ore, some of which is Bessemer, was proved up on this property at the time it was developed by D. E. Woodbridge in 1904. It was acquired by the Clergue interests at that time, but no mining has been done.

Drawback Rulings on Shipments to the Philippines.

WASHINGTON, D. C., August 24, 1909.—The decision rendered by the Bureau of Insular Affairs denying free entry into the Philippines to American goods packed in containers made of imported tin plate on which drawback has been paid emphasizes the importance to manufacturers of a clear understanding of the recently enacted legislation providing for reciprocal free trade between the United States and the Philippines as found in section 5 of the Payne Tariff act and the independent law revising the existing tariff of the archipelago, both of which were approved by the President on August 5. The bureau's adverse ruling is based on a proviso to section 5 of the Payne act, which, referring to the privilege of free entry granted to various products of the Philippines reads as follows:

> Provided, however, that in consideration of the exemptions aforesaid, all articles, the growth, product or manufacture of the United States upon which no drawback of customs duty has been allowed therein, shall be admitted to the Philippine Islands from the United States free of duty.

Peculiar Status of the Philippines.

Since Congress first undertook to provide tariffs between the Philippines and the United States, the relation of the archipelago to the mainland has been peculiar. While the islands have been treated as a foreign country for general tariff purposes, drawbacks on shipments to the archipelago have been denied on the ground that the islands are domestic territory. Now that practically free trade is authorized, there is more reason in the prohibition of drawbacks which has been embodied in section 5 of the Payne Tariff act above quoted, and manufacturers and exporters should take notice that goods made for the foreign trade in whole or in part of materials or packed in containers or coverings of foreign origin on which drawback has been allowed are not eligible to free entry into the Philippines, but will be required to pay the same rates of duty as would be levied if the entire shipment originated in a foreign country.

It should be understood in this connection that the new tariff laws do not prohibit free entry into the Philippines of articles manufactured in the United States in whole or in part from materials of foreign origin, the prohibition being limited to such articles upon which drawback has been paid or claimed. It is probable that in some cases manufacturers will be called upon to decide a nice question as to whether it is more profitable to collect drawback on the materials used in the manufacture of goods shipped to the Philippines and pay duties, which under the new law average about 20 per cent. ad valorem, or sacrifice the drawback in consideration of free entry. In most cases the latter alternative would be more profitable, but occasionally the drawbacks would exceed the duties, especially in the case of machinery, in the construction of which under Treasury rulings practically finished parts, auxiliaries, &c., of foreign origin are permitted to be used with benefit of drawback of the duty paid thereon. It should be noted in this connection that the duties on machinery as provided by the new Philippine tariff law are relatively low, ranging from 10 to 20 per cent. ad valorem, while the rate of the Payne tariff law on miscellaneous manufactures of metal which might be used in the production of machinery intended for shipment to the Philippines is 45 per cent.

Manufacturers and exporters shipping goods to the Philippines should be particularly careful to see that these are covered by the necessary papers containing proofs of origin and direct shipment; otherwise vexatious and costly delays may be encountered. W. L. C.

Sheffield, England, manufacturers of tool steel have expressed surprise at a recent specification of the Admiralty in which a tool steel manufactured in Austria was called for for the West India Docks. An explanation of this preference is asked.

NEWS OF THE WORKS.

Iron and Steel.

The extensive improvements in the plant of the Stewart Iron Company, Sharon, Pa., heretofore referred to, include the installation of an electric power plant in which Buckeye engines will be direct connected to generators. With a view to the ultimate erection of a second blast furnace, larger storage space for ore is being arranged for, the ore yard and steel ore bins being commanded by a Brown-Hoist electric traveling bridge. The present furnace is being equipped for skip filling and will be provided with a Brown revolving top.

The Sweet's Steel Company, Williamsport, Pa., has installed a 16-in. rerolling mill for rail sections from 12 to 30 lb., and will also roll bars and shapes for agricultural implement and bedstead manufacturers. The new mill makes necessary the provision of additional heating furnace capacity.

The furnace of the Berkshire Iron Works, Sheridan, Pa., which has been idle for relining and general repairs since June 10, was blown in last week.

The North Alabama Rolling Mill Company has been incorporated with a capital stock of $150,000, $75,000 of which has been paid in, and has succeeded to the plant and business of the Sheffield Rolling Mill Company, Sheffield, Ala., which recently went into bankruptcy. The plant will be thoroughly overhauled and repaired with the expectation of placing it in operation by November 1. The incorporators are J. W. Worthington, president of the Sheffield National Bank and of the Sheffield Trust Company and vice-president of the Sheffield Company and the Sheffield Cast Iron Pipe & Foundry Company; H. H. Crosby, president of the City Bank of Memphis, Tenn.; K. R. Armstead of Memphis, and A. H. Robinson and N. P. Lasuer of Nashville. J. W. Worthington is president; N. P. Lasuer, vice-president, and H. H. Crosby, secretary and treasurer.

The furnace of the Belfont Iron Works Company, Ironton, Ohio, which was banked June 17, started again August 19 and was burdened for Bessemer iron.

Furnace A of the South Chicago group of the Wisconsin Steel Company, which was blown out for relining at the end of July, is expected to blow in early in September.

The Sheffield Coal & Iron Company, at Sheffield, Ala., is rushing repairs to one furnace preparatory to a resumption of operations October 1.

General Machinery.

L. F. Grammes & Sons, Allentown, Pa., manufacturers of machinery, supplies and brass goods, are erecting a new plant for the equipment of which they will not require any additional machinery.

The Waterloo Drop Forge Company, Waterloo, Iowa, has secured the plant formerly occupied by the Wood Fibre Plaster Company and is remodeling it for its purposes, removing the old machinery which was in the building. This structure is 50 x 150 ft., part two stories, and to it an addition will be built, 50 x 140 ft., two stories, with truss roof. In the addition will be installed five large drop hammers, each hammer to have a crude oil furnace with hood and smokestack and large trimming press. Each furnace, press and hammer will constitute a unit which will be driven by a 10-hp. motor. A large alligator shear will also be installed. The second story of the new building is to be used as a polishing and finishing room. The lower floor of the old building will be divided into an office, shipping and die sinking rooms and modern machine shop, for which considerable new machinery has been ordered. The machinery will be operated by electric motors and purchases were made from the Handlan-Buck Mfg. Company, St. Louis, Mo. The company expects to be in the market from time to time for additional machinery, but has ordered all that it will require at the present time. John R. Morris, formerly of Marshalltown, where he was manager of the Marshalltown Drop Forge Company, is president, and F. Burleigh Johnson is superintendent. In addition to the general drop forge business the company will manufacture a number of tools invented by Mr. Morris.

At the International Harvester Company's Keystone Works, Sterling, Ill., the electric system of machine tool drive is about to be introduced. A new steam turbine plant will furnish the current.

W. H. Foster, Elkhart, Ind., has formed the Foster Machine Company, Inc., to do a general machine shop and manufacturing business.

A horizontal, cross compound, direct acting pumping engine of 2,000,000 gal. daily capacity is being considered for installation at Mechanicsville, N. Y. No bids have as yet been taken.

The entire mechanical equipment of the Providence Steel Casting Company, which became embarrassed some time ago, has been disposed of to parties in Weatherly, Pa., through J. P. Williams, machinery dealer, Industrial Trust Building, Providence, R. I. The sale was made so quietly that the machinery was removed before the sale became known.

The H. K. Porter Company, Pittsburgh, reports the following recent orders received: Four 31-ton 30-in. gauge locomotives, having 13 x 18 in. cylinders, for shipment to the Central Railroad of Haiti; five compound compressed air locomotives for mine service at different plants of the H. C. Frick Coke Company; six standard gauge 4-ton locomotives, cylinders 4½ x 8 in., for shipment to South America; an 18 and a 23-ton standard gauge four-drive saddle tank locomotive and a 53-ton standard gauge saddle tank six-drive locomotive for plantation and warehouse service in Cuba.

The New Process Rawhide Company, manufacturer of gears and gear cutting, Syracuse, N. Y., has awarded contracts for another brick and concrete addition to its plant on Plum street. The building is to be two stories. This is the second addition to be made by the company during the past year.

The Pittsburgh office of the Laidlaw-Dunn-Gordon Company has received contracts for installing six compressors at coke plants of the H. C. Frick Coke Company. The compressors are of the cross compound twin tandem type, with capacity of 1000 cu. ft. of air per minute at a pressure of 1000 lb., and so arranged that either side can operate independently. Other orders include a special-designed three-cylinder crank and flywheel pumping engine and a compound auxiliary pump to operate the elevators in the Oliver Building, Pittsburgh, and two two-stage air compressors driven by 100-hp. motors for the Iowa Gulch Mining Company, Leadville, Colo.

It is possible that the present large machine shops of the Pittsburgh & Lake Erie Railroad, located at McKees Rocks, Pittsburgh, may be removed to Youngstown, Ohio. The reasons given are the unsettled labor conditions and high taxation on the plant. A definite decision in the matter will probably be reached at an early date.

Motor driven centrifugal pumps and several hundred tons of iron piping are to be purchased by the authorities at Mexico, Mo., for the new water system.

The Hazard Engineering Company has been incorporated with a capital stock of $100,000, at Gates, N. Y., a suburb of Rochester, to manufacture automobile and marine gas engines, where a plant will be located. The incorporators are E. C. Hazard, G. E. Hazard and W. J. Robinson, Rochester, and Jno. Bennett, Buffalo.

Bids on pumping machinery and iron piping are to be taken in the near future by the city of Sargent, Neb.

A new pumping station, with improved equipment, is being considered by the Board of Public Works at Manistee, Mich., and J. W. Alford, Chicago, has been retained as consulting expert in the preparation of plans.

The Grimm Mfg. Company has been incorporated at Buffalo, N. Y., to manufacture motors, engines and woodworking machinery. Arrangements for factory have not yet been completed, but one will be located in Buffalo. The incorporators are Edward L. Grimm and John M. Hull, Erie Savings & Loan Association Building, Buffalo.

Foundries.

James W. Carr, iron and brass founder, Richmond, Va., is building a two-story brick foundry on Twenty-fifth street at a cost of $7000. No additional machinery will be required, as the new building is to be erected to provide much needed additional floor space.

The Ohio Steel Castings Company, Lima, Ohio, is reported to be running full and that a night force is in serious contemplation. A 200-ft. addition to the main building is contemplated at an early date.

The Buhl Malleable Company, Detroit, Mich., has let contracts for the construction of a foundry building 62 x 282 ft., of brick and steel, one story, to be erected on Adair street, between Wight street and the Detroit River; also for a six-story brick and steel warehouse building at 161 Woodbridge street.

Reports that Thomas D. West, formerly of the Thomas D. West Foundry Company, would erect a plant at Sharpsville, Pa., for the manufacture of steel car wheels are premature. Mr. West has perfected a new process for making chilled iron car wheels and may erect a plant at Sharpsville to manufacture wheels of this type, but plans have not yet been made.

The steel construction work on the foundry and machine shop buildings being erected on the 20-acre site at the intersection of the Buffalo, Rochester & Pittsburgh, New York Central & Hudson River and Pennsylvania railroads at Rochester, N. Y., for the T. H. Symington Company, manufacturer of railroad specialties and gray malleable castings, at Baltimore, Md.; Corning, N. Y., and Rochester is now nearing completion, and the company announces that it will commence operations in at least a section of the Rochester plant during October. The present plant at Corning, N. Y., is to be vacated at the same time and the equipment moved to Rochester. The Symington plant is one of the largest manufacturing plants under construction in the State, and includes a steel frame foundry building, 422 x 516 ft., equipped with a modern line of electric cranes, cupolas and coal burning furnaces. The machine shop building is also to be of steel frame and concrete construction, three stories, 40 x 128 ft. The furnishing and erecting of steel work was done by the American Bridge Company of New York. The general construction on the buildings is being handled by the A. Friederichs & Sons Company, Rochester. The designing engi-

neer for the new plant is G. K. Hooper, New York; civil engineers in charge of ground improvements, railroad track and trestle work, Lupfer & Remick, Buffalo; designing engineers of special machinery, Hanford & Barkley, Rochester; builder of special milling machinery, Ingle Machine Company, Pochester. The company expects to begin operations with about 300 men, and this force will gradually be increased to about 1000 men. The officers of the company are T. H. Symington, president; W. A. Garrett, vice-president, formerly president of the Seaboard Air Line, and E. John Nichols, secretary. The works manager and superintendent of construction is W. R. Bean. The plant is being erected at an approximate cost of $800,000.

Power Plant Equipment.

The State Board of Public Affairs, Guthrie, Okla., will receive bids until September 12 for a heat and power plant with 2-ton ice making plant, for the Hospital for the Insane at Supply, Okla.

Steam driven pumps and an additional boiler will probably be purchased for installation in the municipal electric generating plant at Glasgow, Mont.

Transformers and rotary converters will probably be purchased this fall by the Mt. Whitney Power Company for a new substation at Tulare, Cal.

Additional hydro-electric power development will be undertaken by the San Joaquin Light & Power Company, Fresno, Cal., in Crane Valley.

A direct connected Corliss engine of 300 hp. will be installed in the power house of the Lackawanna Bridge Company, Buffalo, N. Y., to drive an electric generator.

The Power Equipment Company, formed at Minneapolis, Minn., some time ago, has been incorporated for $50,000.

An irrigation project for which power and pumping machinery will be required has been decided upon by the United States Sugar & Land Company at Portales, N. M. The main office is at Wichita, Kan

The Chippewa River Power Company, Port Huron, Mich., is having plans prepared for a 10,000-hp. power plant, supplemented by a system of storage reservoirs.

Thornton Brothers, Birmingham, Ala., are engineers for an electric generating plant and water works system to be erected at Russellville, Ala.

Power, pumping and refrigerating machinery will be contracted for this fall by the Fort Lupton (Colo.) Utility Company, Greeley, Colo.

A 10,000-hp. hydro-electric plant, for which the Fuller-Coult Company, St. Louis, Mo., has prepared plans, will be built in the vicinity of Murfreesboro, Tenn. The turbines and electric generators have not yet been contracted for.

Geo. P. Costigan, Denver, has made arrangements for building a power plant at Tonopah, Nev., to supply electric current to surrounding mines and mills.

Fires.

The Wheeling Metal & Mfg. Company, Wheeling, W. Va., whose plant was recently considerably damaged by fire, advises that the loss amounted to about $40,000, partly covered by insurance. One hundred workmen are temporarily thrown out of employment, but the company's new plant at Glendale, near Wheeling, is nearing completion and will be ready for operation in about 30 days.

Hardware.

Owing to the rapid increase of its business the Hardware Supply Company, Grand Rapids, Mich., has been obliged to seek larger quarters, and is now erecting a new building at a cost of $14,000. The outlook for fall trade is reported as exceedingly good.

Miscellaneous.

The Driggs-Seabury Ordnance Corporation, Sharon, Pa., is operating the department devoted to the manufacture of automobile parts with a day and night force, and is somewhat behind in its deliveries on account of shortage in machinists and machine operators.

A large pumping plant and water distribution system will be constructed in the near future by the Skagit Valley Water Company, Mt. Vernon, Wash.

Water works, including pumping station and steel tower with 75,000-gal. tank, will be constructed this fall at Bowman, N. D.

In a recent issue it was stated that the John Galvin Metal Stamping Company, 30-50 Hubert street, New York, is to build a new plant at Long Island City. The name of the company is the Metal Stamping Company, and John F. Galvin is president.

The Rolled Steel Belting Company has opened a plant at 9-11 Railroad place, Newark, N. J., where it will manufacture steel belting and supplies, nut locks, pipe unions, flange unions and conveying machinery. The New York office is at 150 Broadway.

The Michigan Pressed Steel Company, Ypsilanti, Mich., will in the near future occupy new offices, for which purpose a building is now being erected by the company. The space now devoted to office room in the main building will be used for manufacturing purposes. With the additional space thus acquired the company expects to increase its output about 40 per cent. All additional equipment required, however, has been purchased, but on account of its rapidly growing business the company anticipates that it will be necessary to make additional improvements next year.

The Gillette Safety Razor Company, Boston, Mass., has not yet completed plans for its new plant to be erected at Newark, N. J. The company is enlarging its Boston plant by equipping a new sixth floor addition, 90 ft. sq.

The city of Rock Rapids, Iowa, has purchased the water works system at that place, heretofore owned by a local company, and will make improvements which will cost about $5000, including the installation of new pumps and the erection of a new power house.

W. W. Mercereau, J. S. Pancake and Bowman Bros., Staunton, Va., have organized a company with $50,000 capital stock, which will erect a two-story garage, 74 x 116 ft., in which will be a machine shop for repairs, the equipment to be motor driven. The building will accommodate from 150 to 200 machines.

The Universal Portland Cement Company, Chicago, Ill., is increasing the capacity of its plant No. 5, at Universal, Pa., from 4550 to 10,000 bbl. per day. All the new buildings except the stock house and the finishing mill are practically completed and will be ready for occupation by January 1.

The Pittsburgh Reinforced Brazing Company recently repaired a break in a heater box for the Pittsburgh Railway Company without removing the casting from its location in the power house. The break was in a casting about 2 x 3 ft., which, after being brazed, withstood a test of 250 lb. pressure without showing any indications of a fracture.

The Packard Motor Car Company, Detroit, Mich., has completed plans for a foundry building, 132 x 179 ft., two stories, of reinforced concrete and brick, to be added to its plant at East Grand Boulevard and the Belt Line.

The Simplex Motor Car Company, Mishawaka, Ind., has completed plans for a large addition to its plant, the estimated cost of which is $400,000.

Car and Locomotive Orders.—In addition to the 3600 freight and 450 passenger cars recently ordered by the Baltimore & Ohio that road is in the market for 1000 box cars, 500 refrigerator and 500 ventilated cars. Of the recent Rock Island order 1000 cars went to the Western Steel Car & Foundry Company, and 500 each to the Standard Steel Car Company and the American Car & Foundry Company. The Burlington road has placed 500 flat cars with the American Car & Foundry Company, and the Chicago Great Western has ordered 1500 steel under frame cars from the American Car & Foundry Company and the Ann Arbor road 500 coal cars from the Standard Steel Car Company. The Chesapeake & Ohio, which has ordered 2000 cars in all, is having 100 box cars repaired. The Chicago & Northwestern, which ordered 1500 steel under frame gondolas from the American Car & Foundry Company, will buy 50 passenger cars. The Union Railroad has ordered 400 steel under frame cars, the Diamond Match Company 25 flat cars and the Pittsburgh & Lake Erie 50 steel flat cars. The Harriman lines will buy 75 additional passenger cars and the Texas Southeastern 50 flat cars. In Canada the Grand Trunk Pacific is reported to have placed 200 stock cars, 700 box cars, 300 flat cars and 200 refrigerator cars. Among locomotive orders are 35 for the Great Northern, 5 for the Burlington, 17 for the Northern Pacific, 20 for the Alabama Great Southern, with scattering orders amounting to 50 and an inquiry from the B. & O. for 60 steam and 2 electric locomotives. The St. Paul will build 25 locomotives in its own shops.

The American Bridge Company recently shipped from its works at Ambridge, Pa., near Pittsburgh, two car transfer steel barges, and is now building three steel barges to carry oil in bulk. About 400 tons of steel were used in each of the two transfer barges, no wood being used in their construction, except for rubbing strips on each side.

The erection of the steel work of the new plant of the Deforest Sheet & Tin Plate Company, Niles, Ohio, has been completed, and the plant is nearly all under roof. Work is being rushed and the company expects to be able to begin manufacturing operations about October 15.

The Iron and Metal Trades

Pig Iron Markets Active.

Advancing Prices on All Grades.

The week has been marked by an active pig iron market in all selling centers, particularly in the East, with advancing prices for both steelmaking and foundry irons. It is becoming more and more a sellers' market, special significance being given to the rate at which basic pig iron has advanced in eastern Pennsylvania.

Buying of basic by Eastern steel works has continued, showing a still unsatisfied demand for iron for this year. Purchases of 24,000 tons for the first half of 1910 were made by one interest at $18, delivered, or $3 above the market of early June. Eastern furnaces are not eager for business for next year either in foundry or basic, and the question of the adequacy of supplies of both scrap and pig iron in that district in the next few months is earnestly discussed.

Foundries have been in the market in all parts of the country in the past week, and in eastern New York and New England there has been conspicuously good buying for 1909 requirements. In general the advance on foundry iron has been about 50 cents on this movement, and Southern grades are squarely established on the $13.50 basis for No. 2 at Birmingham.

Bessemer iron in the central West has advanced 50 cents at Valley furnace under buying for this year's delivery, one steel company having taken 15,000 tons at or near $16.50 from Bessemer Pig Iron Association furnaces, and 5000 tons from another interest at $16.75.

A Pittsburgh steel company has bought 11,000 tons of basic iron at $15.25, Valley furnace, and slightly higher. Pittsburgh foundries have also been in the market, in one case 5000 tons being bought.

Additions to the list of active blast furnaces are being made each week, both by merchant interests and steel companies, and at the present pace the record rate of production will soon be overtaken. The United States Steel Corporation will have 94½ per cent. of its furnace capacity in operation when four furnaces now about to resume are blown in, and its August pig iron production will easily make a new record.

In finished material the concern of manufacturers is centered in deliveries, and the pressure is growing. Car business added to that in structural lines has put plate and structural mills many weeks behind, and deliveries are still tightening.

In structural material the principal contract, the bridges and elevated work for the New York, West Chester & Boston, amounting to 22,000 tons, has been taken by the leading interest. Otherwise there is nothing noteworthy in new construction. Several good inquiries are pending, however, particularly in the Chicago District, where the Harris Trust Company Building will require 4600 tons and the new Sherman House 5000 tons.

Bar mills have made new production records in July and August, and the volume of specifications is still unprecedented, reinforced concrete work furnishing a larger percentage than ever. Some consumers are offering premiums, and one or two mills are quoting 1.40c., Pittsburgh, for steel bars.

Little rail business has been closed for this year apart from 12,000 tons for the Southern Railway, which will be rolled at Sparrows Point. Of the 200,000 tons booked in the Chicago District for 1910 about one-half is open hearth steel.

The situation in old material is being watched sharply in view of the developments in pig iron. In the East steel melting scrap is higher now that basic iron has advanced. The extent to which imports may become a factor is in doubt. Foreign pig iron markets have already advanced in sympathy with the movement here, No. 3 Middlesbrough warrants being 51s. 6d. on Tuesday, and similarly foreign scrap will be carried up by even the beginning of demand from this side.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

	Aug.25, 1909.	Aug.18, 1909.	July28, 1909.	Aug.26, 1908.
PIG IRON, Per Gross Ton:				
Foundry No. 2, standard, Philadelphia	**$17.25**	$17.25	$16.75	$16.50
Foundry No. 2, Southern, Cincinnati	**16.75**	16.25	15.75	15.50
Foundry No. 2, local, Chicago	**17.50**	17.00	17.00	17.35
Basic, delivered, eastern Pa.	**17.50**	17.25	16.50	15.00
Basic, Valley furnace	15.25	15.25	15.25	14.50
Bessemer, Pittsburgh	**17.40**	16.90	16.90	15.90
Gray forge, Pittsburgh	**15.65**	15.15	14.90	14.65
Lake Superior charcoal, Chicago	19.50	19.50	19.50	19.50
BILLETS, &c., Per Gross Ton:				
Bessemer billets, Pittsburgh	**24.50**	24.00	24.00	25.00
Forging billets, Pittsburgh	28.00	28.00	28.00	27.00
Open hearth billets, Philadelphia	**27.00**	27.00	25.50	26.20
Wire rods, Pittsburgh	31.00	31.00	31.00	33.00
Steel rails, heavy, at mill	28.00	28.00	28.00	28.00
OLD MATERIAL, Per Gross Ton:				
Steel rails, melting, Chicago	**16.00**	16.00	14.75	14.25
Steel rails, melting, Philadelphia	**17.00**	17.00	16.00	14.50
Iron rails, Chicago	**19.00**	18.50	17.00	16.75
Iron rails, Philadelphia	**19.75**	19.75	19.50	20.00
Car wheels, Chicago	**17.00**	16.00	16.00	16.00
Car wheels, Philadelphia	**16.00**	16.00	15.00	15.00
Heavy steel scrap, Pittsburgh	**16.75**	16.50	15.75	14.50
Heavy steel scrap, Chicago	**15.50**	15.00	14.25	13.00
Heavy steel scrap, Philadelphia	**17.00**	17.00	16.00	14.50
FINISHED IRON AND STEEL, Per Pound:	Cents.	Cents.	Cents.	Cents.
Refined iron bars, Philadelphia	**1.47**	1.45	1.45	1.40
Common iron bars, Chicago	**1.40**	1.40	1.35	1.50
Common iron bars, Pittsburgh	**1.50**	1.50	1.45	1.40
Steel bars, tidewater, New York	**1.51**	1.51	1.46	1.56
Steel bars, Pittsburgh	**1.35**	1.35	1.30	1.40
Tank plates, tidewater, New York	**1.56**	1.56	1.51	1.76
Tank plates, Pittsburgh	**1.40**	1.40	1.35	1.60
Beams, tidewater, New York	**1.56**	1.56	1.51	1.76
Beams, Pittsburgh	**1.40**	1.40	1.35	1.60
Angles, tidewater, New York	**1.56**	1.56	1.51	1.76
Angles, Pittsburgh	**1.40**	1.40	1.35	1.60
Skelp, grooved steel, Pittsburgh	**1.40**	1.35	1.35	1.45
Skelp, sheared steel, Pittsburgh	**1.50**	1.45	1.45	1.50
SHEETS, NAILS AND WIRE, Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	2.20	2.20	2.20	2.50
Wire nails, Pittsburgh*	1.80	1.80	1.80	1.95
Cut nails, Pittsburgh	1.75	1.75	1.75	1.80
Barb wire, galv., Pittsburgh*	2.10	2.10	2.10	2.40
METALS, Per Pound:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York	13.50	13.62½	13.50	13.62½
Electrolytic copper, New York	**13.25**	13.25	13.00	13.50
Spelter, New York	**5.85**	5.75	5.35	4.65
Spelter, St. Louis	**5.70**	5.60	5.27½	4.50
Lead, New York	**4.40**	4.37½	4.35	4.57½
Lead, St. Louis	**4.32½**	4.25	4.20	4.40
Tin, New York	**30.45**	30.02½	29.30	29.25
Antimony, Hallett, New York	**8.00**	8.12	7.50	8.00
Nickel, New York	45.00	45.00	45.00	45.00
Tin plate, 100 lb., New York	$3.64	$3.64	$3.64	$3.89

* These prices are for largest lots to jobbers.

Prices of Finished Iron and Steel F.O.B. Pittsburgh.

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural steels and sheets, No. 11 and heavier; 85c. on sheets, Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Structural Shapes.—I-beams and channels, 3 to 15 in., inclusive, 1.40c., net; I-beams over 15 in., 1.50c., net; H-beams over 8 in., 1.60c.; angles, 3 to 6 in., inclusive, ¼ in. and up, 1.45c., net; angles, over 6 in., 1.50c., net; angles, 3 x 3 in. and up, less than ¼ in., 1.60c., base, half extras, steel bar card; tees, 3 in. and up, 1.50c., net; zees, 3 in. and up, 1.45c., net; angles, channels and tees, under 3 in., 1.35c., base, plus 10c., half extras, steel bar card; deck beams and bulb angles, 1.65c., net; hand rail tees, 2.75c., net; checkered and corrugated plates, 2.75c., net.

Plates.—Tank plates, ¾ in. thick, 6¼ in. up to 100 in. wide, 1.40c., base. Extras over this price are as follows:

Tank, ship and bridge quality, ¼-in. thick on edges, 100 in. wide, down to but not including 6 in. wide, is taken as base.

Steel plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot, shall be considered ¼-in. plate. Steel plates over 72 in. wide must be ordered ¼-in. thick on edge, or not less than 11 lb. per square foot, to take base price. Steel plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. shall take the place of 3-16-in.

Percentages as to overweight on plates, whether ordered to gauge or weight, to be governed by the Association of American Steel Manufacturers' Standard Specifications.

Gauges under ¼-in. to and including 3-16-in. plates on thin edges	$0.10
Gauges under 3-16-in. to and including No. 8	.15
Gauges under No. 8 to and including No. 9	.25
All sketches (excepting straight taper plates varying not more than 4 in. in width at ends, narrowest end being not less than 30 in.)	.10
Complete circles	.20
Boiler and flange steel plates	.10
"A. B. M. A." and ordinary firebox steel plates	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Shell grade of steel is abandoned.	
For widths over 100 in. up to 110 in	.05
For widths over 110 in. up to 115 in	.10
For widths over 115 in. up to 120 in	.15
For widths over 120 in. up to 125 in	.25
For widths over 125 in. up to 130 in	.50
For widths over 130 in	1.00

TERMS.—Net cash 30 days. Pacific Coast base, 1.30c. f.o.b. Pittsburgh.

Sheets.—Minimum prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual advances for small lots from store, are as follows: Blue annealed sheets, No. 10 and heavier, 1.65c.; Nos. 11 and 12, 1.70c.; Nos. 13 and 14, 1.75c.; Nos. 15 and 16, 2.05c.; box annealed sheets, Nos. 17 to 21, 2c.; Nos. 22 to 24, 2.05c.; Nos. 25 and 26, 2.10c.; No. 27, 2.15c.; No. 28, 2.20c.; No. 29, 2.25c.; No. 30, 2.35c.; Galvanized sheets, Nos. 13 and 14, 2.25c.; Nos. 15 and 16, 2.35c.; Nos. 17 to 21, 2.50c.; Nos. 22 to 24, 2.65c.; Nos. 25 and 26, 2.85c.; No. 27, 3.05c.; No. 28, 3.25c.; No. 29, 3.25c.; No. 30, 3.60c. Painted roofing sheets, No. 28, $1.55 per square. Galvanized roofing sheets, No. 28, $2.80 per square for 2½-in. corrugations.

Wrought Pipe.—Discounts on steel pipe, ¾ to 6 in., in carloads to the largest trade, are 81 and 5 per cent. off list, and on iron pipe, ¾ to 6 in., are 77 and 5 per cent. off list.

Boiler Tubes.—Regular discounts are as follows:

Boiler Tubes.

	Steel.
1 to 1½ in	50
1¾ to 2¼ in	62
2¾ to 5 in	70
2½ in.	64
6 to 13 in	62

2½ in. and smaller, over 18 ft. long, 10 per cent. net extra.
2¾ in. and larger, over 22 ft. long, 10 per cent. net extra.

Wire Rods.—Bessemer, open hearth and chain rods, $31.

Steel Rivets.—Structural rivets, 1.70c., base; boiler rivets, 1.80c., base.

Chicago.

FISHER BUILDING, August 25, 1909.—(*By Telegraph.*)

The principal factors in the strength of the market are continued heavy buying by railroads and the unprecedented demand for structural material. The influence of the railroads comes into the market from many different angles. The direct purchases of track supplies and car shop material are in excess of the capacity of the mills. Car orders contribute to the volume of business that presses on the plate mills, and contracts with malleable foundries reach the pig iron market in larger requisitions for iron. In the structural field new and unexpected demands come into the market each week, and the estimating forces of the leading interest were never so far behind in their work as at the present time—not even in former active periods. This pressure for estimates is due chiefly to the fact that a large amount of detail is involved in figuring tonnage and cost on buildings of steel construction, and there is more building of this kind in prospect than ever before. In bars and other branches of the market the strength is well maintained. The order of the Chicago & Northwestern Railroad from the Pullman shops of steel coaches and baggage, parlor and dining cars to equip all through trains opens a new field of development in business with Western roads. The opening of the books for rail orders for 1910 delivery has resulted in contracts being placed by Western roads for over 200,000 tons, and negotiations are proceeding for a large additional quantity of standard rails, but the details of these transactions are not available here. It is known, however, that the leading roads have made large estimates of their requirements for 1910. Something over half of the orders already booked are for open hearth rails. In general, market conditions in the West are very strong and the business in hand or in prospect for the immediate future is in excess of the capacity of Western steel mills.

Pig Iron.—The sale of iron for 1910 delivery began quietly the past week, without any notable effort on the part of buyers to make large contracts or any corresponding effort on the part of furnaces to sell their product. Some of the leading producing interests, both Northern and Southern, still refuse to make any price for delivery beyond December, and buyers in general are disposed to follow the same conservative policy. The Southern interests ask $14, Birmingham, for first quarter, and have done quite a little business on that basis, in scattering lots of no notable magnitude. The Northern situation has failed to develop any definite price differing from quotations for the remainder of the year, excepting in one notable transaction. There was a sale of 10,000 tons from the Bay View furnaces to a large machinery manufacturer for the first quarter of 1910 at $18.50, f.o.b. Milwaukee, for No. 2 foundry. Another notable transaction of the week for last half delivery was the purchase by the Crane Company, Chicago, of about 7500 tons of Northern foundry and malleable Bessemer, including one lot of Virginia iron. Altogether the sales of the week in this market have amounted to over 35,000 tons, about equally divided between Northern and Southern iron, most of the Southern being for delivery during this year. The activity in Southern iron has taken out of the market about all the No. 2 that could be had below $13.50, Birmingham, and this price is now believed to be the minimum, with some sellers asking $14. Similar strength has developed in Northern iron, as the advance in prices at southern Ohio furnaces has carried them out of reach of this market, and left it in the hands of local interests, which are well sold up for the remainder of the year. There has been an active demand for Jackson County silveries, resulting in sales of over 2000 tons. The leading Jackson County furnace is now asking $19, equivalent to $21.40, Chicago, for 8 per cent. iron. The following prices are for August and September delivery, f.o.b. Chicago:

Lake Superior charcoal	$19.50 to $20.00
Northern coke foundry, No. 1	18.00 to 18.50
Northern coke foundry, No. 2	17.50 to 18.00
Northern coke foundry, No. 3	17.00 to 17.50
Northern Scotch, No. 1	18.50 to 19.00
Southern coke, No 1	18.35 to 18.85
Southern coke, No. 2	17.85 to 18.35
Southern coke, No. 3	17.35 to 17.85
Southern coke, No. 4	16.85 to 17.35
Southern coke, No. 1 soft	18.35 to 18.85
Southern coke, No. 2 soft	17.85 to 18.35
Southern gray forge	16.35 to 16.85
Southern mottled	16.10 to 16.60
Malleable Bessemer	17.50 to 18.00
Standard Bessemer	18.90 to 19.40
Jackson Co. and Kentucky silvery, 6 %	19.90 to 20.40
Jackson Co. and Kentucky silvery, 8 %	20.90 to 21.40
Jackson Co. and Kentucky silvery, 10 %	21.90 to 22.40

(*By Mail.*)

Billets and Rods.—None of the mills in this district will accept orders for billets, and the occasional new buyer has to seek elsewhere for supplies. Wire rods have been quoted in this market at $32, Pittsburgh, since August 13.

Rails and Track Supplies.—The event of the past week was the opening of the books for rail contracts for 1910 delivery. Contracts amounting to over 200,000 tons have been taken from Western roads, something over half of this aggregate being for open hearth rails. The ordinary run of orders for early deliveries has been very satisfactory, and present indications are that the enlarged capacity of this district will be kept busy through the fall and winter. The rail mills, in fact, are the only branch of the steel industry which will be able to keep up with the prospective volume of business through the remainder of the year. In track supplies orders are accumulating more rapidly than they can be taken care of, and some business is being turned away because the urgent demands of the railroads for immediate deliveries cannot be met. The officials of the leading roads are giving the matter serious attention. For a year and a half they were able to get immediate deliveries, and they did not realize soon enough that the mills were filling up with business. Orders for light rails continue in satisfactory volume. Prices remain unchanged as follows: 40 to 45 lb. sections, $26; 30 to 35 lb. sections, $26.75; 16, 20 and 25 lb. sections, $27; 12-lb. sections, $28, Chicago, less 50c. a ton on lots of 500 tons and $1 a ton on lots over 500 tons.

Structural Material.—The feature of the week was the large number of buildings of moderate size for which contracts were taken by various firms. The Isham Estate Building on State street, in Chicago, 1150 tons, went to the Morava Construction Company; the Alworth Building, Duluth, Minn., 990 tons, to the McClintic-Marshall Construction Company; the Fidelity Trust Company, Tacoma, Wash., 390 tons, to the South Halsted Street Iron Works, Chicago; the new prison at San Quentin, Cal., 164 tons, to the Western Iron Works, San Francisco; the Jean Parker School, San Francisco, 360 tons, to the Ralston Iron Works, and the new shaft house at the Princeton mine of the Cleveland-Cliffs Iron Company, 310 tons, to the Worden-Allen Company, Milwaukee. The American Bridge Company took contracts for a new warehouse at Minneapolis for the Interstate Transfer Company, 200 tons, and also 162 tons for an office building at Texas City, Texas. The Northwestern Railroad placed new orders for 210 tons of bridge material. Considerable business is pending in Chicago, including the Harris Trust Company Building, 4600 tons, and the new Sherman House, which will probably call for 5000 tons. The Geo. A. Fuller Company recently took the contract from the Brooks Estate for a new office building in Chi-

cago to call for 2800 tons, but the contract for the steel has not yet been placed with the mills. At St. Louis the contract for the Municipal Court Building, 1000 tons, was let to the Gray Construction Company of that city, but has not yet reached the mills. There is a steady increase in orders for material for smaller buildings, many of which are taken care of by jobbers or fabricators out of stock. A notable feature of railroad bridge orders is the general specification by railroads of the heavy type of bridges, originated by the Santa Fe, to carry ballast floors, the usual depth of earth and ballast to be carried being 3 ft. The mills are heavily overtaxed with orders for structural material and the independent companies in this market are asking 1.63c., base, for prompt deliveries, but the leading interest continues to quote 1.58c., base, Chicago.

Plates.—Heavy specifications for car builders and for structural material have put the plate mills far behind in their deliveries, and the difficulty of taking care of the business is increasing each week. The demand for steel cars as well as the large volume of structural business in prospect makes it more and more apparent that the Western mills will not be able to take care of the business offered them in this market. The Chicago, Rock Island & Pacific contracted last week with the Standard Steel Car Company for 1000 steel gondola cars and 500 furniture cars with steel underframes. The Chicago & Northwestern has ordered from the Pullman Company 125 steel passenger, drawing room and dining cars to equip all through trains. The same road has also ordered from the American Locomotive Company 75 passenger locomotives of the Pacific type rated to haul a train of 14 standard Pullman cars. The freight car orders of the Northwestern the past year have aggregated 8000 cars. Prices on plates are firm at 1.58c., Chicago.

Sheets.—The usual run of new orders continues along with specifications on old contracts. Prices remain unchanged but strong, and the mills have the usual difficulty in arranging satisfactory delivery on new business.

Bars.—The general run of new business and specifications on old contracts continue to keep the bar mills about 60 days behind on deliveries, and the market grows stronger from day to day. A difficult feature of the situation is that buyers for more than a year were accustomed to very prompt delivery, and some of them do not yet appreciate the actual reality that the mills are unable to keep up with the growing volume of business. The independent mills in this district were asking 1.53c. for soft steel bars for several weeks before the leading interest announced this price last week, a fact which shows the substantial foundation for the advance. A curious feature of the market is that while it is practically impossible to get prompt deliveries of steel bars on new orders, the bar iron mills are asking a higher figure for deferred deliveries, as they anticipate a larger buying movement in 60 or 90 days. Very little of the bar business now under contract is for delivery beyond January 1, except on yearly agricultural contracts. The demand is growing so rapidly for both steel and iron bars that a heavy buying movement is anticipated when prices are available for 1910 delivery. The minimum on soft steel bars is now 1.53c., hard steel bars are quoted at 1.40c. to 1.45c., and iron bars 1.40c. to 1.45c., Chicago.

Merchant Pipe.—The unusual activity in building operations throughout the West has stimulated the jobbing demand for pipe. Specifications from implement manufacturers and other large consumers are also satisfactory, and the general volume of business is good, although not so large as the demand for other lines of steel products. Prices remain unchanged.

Boiler Tubes.—The demand is more or less irregular for this specialty, but prices remain unchanged.

Cast Iron Pipe.—Routine orders have been very satisfactory the past week, running from a carload to 100 or 200 tons. A number of contracts have been let by smaller municipalities for water pipe, but there have been no lettings of any magnitude. Orders for gas pipe aggregate a good volume of business, and the railroads are buying liberally in small lots for their requirements. Prices remain unchanged. We quote per net ton, Chicago, as follows: Water pipe, 4-in., $27.50; 6 to 12 in., $26.50; 16-in. and up, $25.50, with $1 extra for gas pipe.

Metals.—There is a better inquiry for metals owing to the general improvement in the metal consuming industries. Spelter and tin are higher, and there is an improved demand for casting copper. Quotations are as follows: Casting copper, 13¼c.; lake, 13¾c. to 14c., in car lots, for prompt shipment; small lots, ¼c. to ⅜c. higher; pig tin, car lots, 31½c.; small lots, 33c.; lead, desilverized, 4.45c. to 4.55c., for 50-ton lots; corroding, 4.70c. to 4.80c., for 50-ton lots; in car lots, 2¼c. per 100 lb. higher; spelter, 5.75c. to 5.85c.; Cookson's antimony, 10½c., and other grades, 9¾c. to 10¼c.; sheet zinc is $7.50, f.o.b. La Salle, in car lots of 600-lb. casks. On old metals we quote: Copper wire, crucible shapes, 13¼c.; copper bottoms, 11½c.; copper clips, 12¼c.; red brass, 11½c.; yellow brass, 9¼c.; light brass, 6¾c.; lead pipe, 4½c.; zinc, 4.50c.; pewter, No. 1, 23c.; tin foil, 25c.; block tin pipe, 27c.

Old Material.—The scrap market continues very strong with an advance in prices. Nearly all the large consumers of wrought, steel, malleable and cast scrap are in the market, and there is but little material in transit for immediate delivery. The yard dealers ask high figures for their accumulated stock, and are moving a considerable tonnage of their scrap, especially rolling mill material, which is in very active demand. Car wheel foundries have been inquiring for old wheels recently, and find no stock available excepting in the hands of large dealers, who are holding their wheels for a substantial profit. The Chicago, Burlington & Quincy offers a list of over 3000 tons of old material to close this week. The following prices are per gross ton, f.o.b. Chicago:

Old iron rails	$19.00 to $19.50
Old steel rails, rerolling	16.50 to 17.00
Old steel rails, less than 3 ft.	16.00 to 16.50
Relaying rails, standard sections, subject to inspection	22.50 to 23.50
Old car wheels	17.00 to 17.50
Heavy melting steel scrap	15.50 to 16.00
Frogs, switches and guards, cut apart	15.50 to 16.00
Shoveling steel	14.00 to 14.50

The following quotations are per net ton:

Iron angles and splice bars	$18.00 to $18.50
Iron car axles	20.50 to 21.00
Steel car axles	18.50 to 19.00
No. 1 railroad wrought	15.00 to 15.50
No. 2 railroad wrought	14.00 to 14.50
Springs, knuckles and couplers	14.50 to 15.00
Locomotive tires, smooth	16.00 to 16.50
No. 1 dealers' forge	12.00 to 12.50
Steel axle turnings	10.50 to 11.00
Machine shop turnings	9.00 to 9.50
Cast and mixed borings	6.50 to 7.00
No. 1 busheling	12.50 to 13.00
No. 2 busheling	9.00 to 9.50
No. 1 boilers, cut to sheets and rings	11.00 to 11.50
No. 1 cast scrap	14.25 to 14.75
Stove plate and light cast scrap	12.00 to 12.50
Railroad malleable	14.00 to 14.50
Agricultural malleable	12.00 to 12.50
Pipes and flues	11.25 to 11.75

Cleveland.

CLEVELAND, OHIO, August 24, 1909.

Iron Ore.—A fairly good demand is noted for small lots. A number of such sales are reported, while quite a few inquiries are in the market for lots ranging from 5000 to 15,000 tons. A large share of the inquiries is from furnace interests that bought to cover the bulk of their needs some time ago. With the possibility that their furnaces will be crowded to their fullest production the next few months, these consumers have decided to take on a little more ore. There is little Bessemer ore to be had now, and all the merchant ore firms are well sold up on other grades. There is already some talk about next season's ore prices and some of the shippers are predicting an advance of 25c. to 50c. a ton. It is believed that a buying movement will start in late in the fall, in view of the present activity in the iron and steel market and the bright outlook for the coming year. In the past two years no ore sales have been made until well along in the spring. Ore shipments continue very heavy and the indications are that the August movement will exceed 7,000,000 tons and break all former records. So far this season the bulk of the ore has been sent directly to the furnace yards. Many consumers are now asking that their ore be stored on the dock piles and this is delaying the dispatch of boats. In spite of the heavy movement plenty of vessel tonnage is available for ore and shippers are all well covered by contracts. It is believed, however, that during September cargoes will be provided for practically all of the available boats. Ore prices at Lake Erie docks, per gross ton, are as follows: Old Range Bessemer, $4.50; Mesaba Bessemer, $4.25; old range non-Bessemer, $3.70; Mesaba non-Bessemer, $3.50.

Pig Iron.—The demand for Bessemer iron is quite active and prices are firmer. We note the sale of 15,000 tons to the Youngstown Sheet & Tube Company for delivery before the end of the year at $16.50, Valley furnace, of which 10,000 tons was taken by a Cleveland interest. Very little foundry iron has been sold in this district lately, but the market is firm and there is fair inquiry for round lots for delivery outside of this district. The most important inquiry is from a stove company in Detroit, which asks for 9000 tons for delivery during 1910. The inquiry includes 3500 tons each of No. 2 and No. 3 and 2000 tons of high silicon. Among other inquiries is one from a local consumer for 1000 tons of No. 2 foundry, one from Pittsburgh for 2000 tons, inquiries from central and southern Ohio for 1000 and 1500 tons, and an inquiry from Syracuse, N. Y., for 2000 tons, the last inquiry being for malleable. These inquiries are all either for the first quarter or first half delivery. Foundry iron consumers appear to be well covered for the balance of the year, and there is very little inquiry for iron for delivery before next year. We note the sale of a small tonnage of No. 2 at $16, local furnace, for outside shipment during the last quarter, this being the minimum price that is being quoted by Cleveland furnaces. For Cleveland delivery local furnaces are holding to $16.50 for No. 2, delivered over the

balance of the year. Valley furnaces are asking $15.50 to $16 for No. 2 for delivery this year, the former price now appearing to be the minimum. For first quarter and first half delivery local furnaces are adhering to $16.50, at furnace, for No. 2, and several of the Valley furnaces are asking the same price. Although some tonnage is reported sold at this price, consumers as a rule are holding off, being unwilling as yet to pay the advance. For the balance of the year we quote, delivered, Cleveland, as follows:

Bessemer	$17.40
Northern foundry, No. 1	$16.90 to 17.15
Northern foundry, No. 2	16.40 to 16.65
Northern foundry, No. 3	15.90 to 16.15
Southern foundry, No. 2	17.35 to 17.85
Gray forge	15.25 to 15.50
Jackson County silvery, 8 per cent. silicon	20.05

Finished Iron and Steel.—The demand continues heavy in all lines, and the most of the mills are getting further behind on deliveries. The bulk of the tonnage is in orders on contract, but a fair volume of new business is coming out, largely in steel bars. One leading independent producer has advanced its price on plates and shapes to 1.45c., Pittsburgh, but other mills are still quoting 1.40c., Pittsburgh, for car lots. Steel bars are very firm at 1.35c., Pittsburgh. Heavy steel bar specifications are coming from the implement makers, and there is some inquiry from this source for additional tonnage for consumers whose requirements are greater than they expected. Heavy bar specifications are coming from the bolt and rivet makers, whose business has become very good. The demand for plates continues good. Boiler and tank shops in this vicinity are crowded with work and are specifying freely. The Lake Erie Excursion Company, Buffalo, will receive bids August 28 for a 215-ft. passenger boat. Although no contracts for freight boats for the lakes have been closed the past few weeks, it is believed that the present condition of the lake trade and the bright outlook for next year will result in the placing of some orders for freighters later in the season. Sheet prices are very firm. The demand continues good and some of the mills are unable to make prompt deliveries. Good specifications for structural material continue to come from local structural shops that have enough work on hand to keep them busy for some time. The demand for iron bars has improved, some business having come during the week from railroads and car companies. Prices are fairly firm at 1.40c. to 1.50c., Cleveland. Bolt makers have made a general advance of 7½ per cent. in prices, making a total advance of 12½ per cent. in a month. Owing to slow deliveries by the mills, warehouse orders received by jobbers continue very heavy for all lines. Jobbers have advanced store prices on light sheets $2 a ton and on galvanized sheets $3 a ton.

Old Material.—Instead of improving, the market has shown less activity. Prices remain firm and stationary. What little business has been done has been in small lots, none of the consumers having inquiries in the local market for round tonnages. Nearly all the dealers have large stocks on hand, and while plenty of scrap is offered at present prices to meet the demand, dealers seem inclined to hold the bulk of their stocks for better prices. Dealers' prices per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails	$16.00 to $16.50
Old iron rails	17.50 to 18.00
Steel car axles	19.00 to 19.50
Old car wheels	15.50 to 16.00
Heavy melting steel	15.25 to 15.75
Relaying rails, 50 lb. and over	21.50 to 22.50
Agricultural malleable	14.00 to 14.50
Railroad malleable	15.50 to 16.00
Light bundled sheet scrap	8.00 to 8.50

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles	$19.00 to $19.50
Cast borings	7.50 to 8.00
Iron and steel turnings and drillings	9.50 to 10.00
Steel axle turnings	11.00 to 11.50
No. 1 busheling	13.00 to 13.50
No. 1 railroad wrought	14.50 to 15.00
No. 1 cast	13.00 to 13.25
Stove plate	11.00 to 11.50
Bundled tin scrap	10.00 to 10.50

Pittsburgh.

PARK BUILDING, August 25, 1909.—(*By Telegraph*).

Pig Iron.—The market is very active, inquiries being heavy, and a good deal of tonnage has been sold. A few sales have already been made for delivery into next year. The leading purchaser was the Youngstown Sheet & Tube Company, which is credited with having bought through J. G. Butler, Jr., of the Bessemer Pig Iron Association, 7500 tons of Bessemer at $16 and 6500 tons at $16.50, Valley furnace, all for this year's delivery. The same interest is reported to have bought two 1000-ton lots at $16.50 and one 5000-ton lot from a Sharon interest at $16.75, all at Valley furnace. Basic has also been active, the Jones & Laughlin Steel Company having bought 6000 tons from the Bessemer Pig Iron Association at $15.25, Valley furnace, and is credited with having bought about 5000 tons more from outside furnaces at about the same price or a little higher. We also note a sale of 250 tons of standard Bessemer at $16.50 and one of 300 tons at the same price. There have been some heavy sales of foundry iron, a leading local consumer having bought 5000 tons of No. 2 foundry for last quarter at $15.25, and a sale is reported of 1000 tons for first half of next year at a considerably higher price. We note a sale of 1000 tons of gray forge at $14.75, Valley furnace. We quote standard Bessemer iron, $16.50 to $16.75; malleable Bessemer, $15.75 to $16; No. 2 foundry, $15.50; basic, $15.25 to $15.50, and gray forge, $14.75, all at Valley furnace, the freight rate to Pittsburgh being 90c. a ton.

Steel.—Billets and sheet and tin bars are very scarce and hard to obtain for prompt delivery. Consumers are specifying freely against contracts, and shipments by the mills are heavy. We quote Bessemer billets at $24.50 to $25, open hearth billets at $25 to $25.50 and forging billets $28 to $29. Sheet and tin bars in long lengths are $26.50 to $27, Pittsburgh, and $26, minimum, Youngstown.

Iron Ore.—Some heavy sales of iron ore have been made in the past two or three weeks, aggregating 300,000 to 400,000 tons. A leading interest has sold 250,000 to 300,000 tons of non-Bessemer Mesaba and non-Bessemer old range at $3.50 for the former and $3.70 for the latter, guaranteed 51.5 per cent. metallic iron. The same interest has been a heavy buyer of Bessemer ores.

Coke.—The heavy purchases of coke by the United States Steel Corporation have firmed up the market considerably, and standard makes of blast furnace coke for prompt shipment or for balance of this year delivery are now quoted as high as $2 per net ton, at oven, and it is stated that some business has been done at this price.

(*By Mail.*)

The paramount question in the steel trade to-day is whether the present pace is not entirely too fast. It is now six months since the open market was declared in the steel trade, and from that time the pace has steadily increased, bringing advances in prices of pig iron, steel and finished material of $4 to $6 a ton or more. While no signs are apparent of any let up in the activity, many in the trade are inclined to believe that a slowing down might be beneficial all round. The strongest feature of the market to-day is the fact that the railroads have come in as active buyers. The Carnegie Steel Company has started up its Neville Island Furnace, and Edith will go in about September 1. No. 1 blast furnace and the Bessemer plant at Columbus are also being made ready for operation, and when these start all the blast furnaces of the company will be in operation except three or four smaller stacks and one of the Carrie furnaces, which is being repaired. The large local steel interests are operating to practically full capacity, with enough orders on their books to carry them through the balance of the year. Specifications on contracts are pouring into the mills at an almost unprecedented rate. An advance of $1 a ton on blue annealed sheets has been made. Higher prices on nearly all kinds of scrap have been brought about by the heavy demand.

Ferromanganese.—Prices have advanced sharply with the heavy demand. Foreign 80 per cent., for delivery over the balance of this year, is now held at $43 to $44, seaboard. A recent offer of $42.50, seaboard, for a large lot was turned down. The Southern Iron & Steel Company is in the market for 600 tons, and a local interest is inquiring for 150 tons for delivery this year. We note sales for the week of 900 to 1000 tons of foreign 80 per cent. for the balance of the year at $41 to $42.50, seaboard.

Ferrosilicon.—The demand is quite active, and prices on 50 per cent. are slightly higher. We quote $23 for 10 per cent. blast furnace ferrosilicon, $24 for 11 per cent., and $25 for 12 per cent., while 50 per cent is now held at $64 to $64.50, f.o.b. Pittsburgh.

Muck Bar.—The consumption of this material is heavier now than at any time in nearly two years, and the available supply for the open market is limited. We quote best grades of muck bar, made from all pig iron, at $28 to $28.50, Pittsburgh, but note that one seller is asking higher prices.

Skelp.—The new demand is active, the mills making sheared skelp are full of work and prices are higher. We now quote grooved steel skelp at 1.40c. to 1.45c.; sheared, 1.50c. to 1.60c.; grooved iron, 1.65c. to 1.70c., and sheared iron plates, 1.80c. to 1.85c., all for ordinary widths and gauges, f.o.b. Pittsburgh. Sales are reported of 3000 to 4000 tons of sheared iron plates at 1.85c., Pittsburgh.

Steel Rails.—No contracts have yet been taken by the Carnegie Steel Company for rails for next year's delivery, but as several Western and Eastern roads are now making up their estimates some business is likely to be placed at a very early date. Specifications against contracts for this year are coming in freely, and Nos. 1, 2 and 3 Edgar Thomson rail mills are running from 65 to 75 per cent. of capacity. The company received new orders and

specifications against contracts last week for about 2500 tons of light rails. The demand for splice bars is active, the tonnage of orders on the books of the same company being heavier now than for more than a year. Splice bars are firm, at 1.50c., Pittsburgh. We quote standard rail sections at $28, at mill, and light rails as follows: 8 to 10 lb., $34; 12 and 14 lb., $29; 16, 20 and 25 lb., $28; 30 and 35 lb., $27.75, and 40 and 45 lb., $27, f.o.b. Pittsburgh. One leading maker of light rails, located outside the Pittsburgh District, is quoting about $1 a ton higher than these prices, but equalizes freights with Pittsburgh.

Plates.—Orders for cars are steadily increasing and are furnishing a heavy tonnage in plates and shapes to the mills. The New York Central has placed 3600 steel underframe box cars with the American Car & Foundry Company and 2000 cars of the same type with the Standard Steel Car Company. This type of cars takes 7 to 8 tons of plates and shapes for each car; hence these two orders will require upward of 40,000 tons of plates and shapes, all of which will be furnished by the Carnegie Steel Company. The Baltimore & Ohio is placing more orders for cars and several of the Western roads have active inquiries out. Each of the two new battleships now to be built will require about 8000 tons of plates, shapes and bars and a considerable tonnage of special treatment plates. Bids are to be opened by the Government this week for a new collier, which will take 4000 to 5000 tons of plates and shapes. The demand from the boiler shops and other consumers is also quite heavy. The plate mills are now operating to full capacity. We quote ¼-in. and heavier plates at 1.40c., minimum, for large lots, while 1.45c. is being obtained for small lots.

Structural Material.—Inquiries are very active and a tremendous tonnage in structural shapes is in sight, much of which is expected to come out in the next week or two. The McClintic-Marshall Construction Company has taken the steel, 6000 tons, for the buildings for the new open hearth steel plant for the Forged Steel Wheel Company at Butler, Pa. Fabricating concerns are getting more money for their work now than for some time. They are pretty well filled up for the balance of this year, and are stiffer in their ideas as to prices when it comes to bidding on work. The minimum price on beams and channels up to 15-in. is now 1.40c., while for small lots 1.45c. is quoted.

Tin Plate.—Reports widely published that the American Sheet & Tin Plate Company had fixed a price of $3.55 per base box for tin plate for the first quarter of next year, and was entering orders at that price, are absolutely untrue. It has not fixed any price on tin plate for next year, and is not selling for that delivery. The company is steadily increasing the output in its active tin plate mills and is now operating 140 hot tin mills out of 221 serviceable mills. Some of the smaller independent tin plate makers are taking advantage of the situation in this trade, and are asking premiums of 10c. to 15c. a box for reasonably prompt delivery, and in some cases consumers have been compelled to pay these premiums. Other larger independent mills are sold up for the balance of the year and cannot take on any more new business for delivery within the next two or three months. We quote tin plate at $3.40 per base box for 100-lb. cokes, f.o.b. Pittsburgh.

Sheets.—The new demand is enormously heavy, and in the past week the American Sheet & Tin Plate Company received new orders and specifications against contracts for a larger tonnage of sheets than at any time in the past two years and a half. Other sheet mills report a similar situation, being filled up for the next three or four months. Prices are extremely firm, and an early advance is expected. In fact, it was reported last week that the American Sheet & Tin Plate Company had made an advance of $1 a ton in sheets, but this is incorrect, the company having made an advance of $1 a ton in blue annealed sheets several weeks ago. We may state, however, that several of the independent sheet mills are quoting slightly higher prices. The American Sheet & Tin Plate Company is operating to-day 142 hot sheet mills out of a total of 186 serviceable mills. The absolute minimum of the market on sheets is 2.20c. for No. 28 black and 3.25c. for No. 28 galvanized. Roofing sheets are $1.55 per square for painted corrugated, 2½-in. corrugations, and $2.80 for galvanized corrugated. Jobbers charge the usual advances over these prices for small lots.

Bars.—The new demand for both iron and steel bars is quite active and specifications against contracts are pouring into the mills. Consumers are offering premiums for steel bars for spot shipment, but none of the large mills is able to take business of this kind, being filled up. The absolute minimum on steel bars is 1.35c., this price still being made by the Carnegie Steel Company, while Jones & Laughlin and Republic are quoting 1.40c. to 1.45c. at mill. Iron bars are very firm and are held at 1.50c., Pittsburgh.

Hoops and Bands.—A good run of orders is being placed, while specifications against contracts are coming in freely. We quote hoops at 1.45c. minimum, this price being made by only one or two makers, the general market being 1.50c. to 1.55c. Bands are 1.35c. to 1.40c., with steel bar card extras.

Shafting.—Consumers are buying very freely, while specifications against contracts are being received in large volume. We quote cold rolled shafting at 60 per cent. off in carloads and 55 per cent. in less than carloads delivered in base territory. It is stated that these prices are being absolutely maintained.

Spikes.—No specially large contracts for railroad spikes are being placed, but there is a good steady demand made up of small orders, and different spike concerns are operating their plants to full capacity, for the first time in more than a year. The market is very firm, with a decided tendency toward higher figures. We quote $1.65 for railroad spikes, 4½ x 9-16 in. and larger, and for smaller sizes and boat spikes, $1.70, base, subject to standard card extras, with an advance of 5 per cent. in less than carload lots.

Rivets.—The demand is heavier now than at any time for several months, and prices are very firm. We quote 1.70c., base, for round head structural rivets, ½ in. and larger, and 1.80c., base, for cone headed boiler rivets, ½ in. and larger, f.o.b. Pittsburgh, in carload and larger lots.

Merchant Pipe.—Nothing of special interest has developed in the pipe trade in the last week or two, and no large contracts for line pipe are reported as having been given out. The mills are filled up with business, and while there is some talk of early advances in prices, nothing official has been given out. The official discounts on black steel pipe, ¾ to 6 in., are 81 and 5, and on iron pipe, ¾ to 6 in., 77 and 5, in carload and larger lots to the largest trade.

Boiler Tubes.—The demand for locomotive and merchant tubes is steadily increasing. While prices are firmer, there is still some shading being done in the official discounts.

Coke.—Blast furnaces are pretty well covered on their supply of coke for the balance of this year, but several furnaces are in the market for additions to the quantities called for in their contracts. A great scarcity of labor has developed in the Connellsville and other coke regions. The output is now about up to normal and is running close to 400,000 tons per week. We quote standard Connellsville coke at $1.65 to $1.75 per net ton, at oven, for prompt shipment, and $1.80 to $1.85 on contracts, for balance of the year. Standard makes of 72-hr. foundry coke are held at $1.90 to $2.15 for reasonably prompt shipment and from $2.25 to $2.50 on contracts for the rest of the year.

Iron and Steel Scrap.—The great activity in all lines of the steel trade also prevails in the scrap market. Prices are higher. Several local dealers that bid high prices on scrap offered by railroads this month did not get a pound, and it brought much higher prices from other dealers than they have been paying for some months. Dealers now prefer to be long on scrap and are strongly inclined to hold their material for higher prices rather than sell it at what consumers offer to-day. Nearly all consumers of scrap are running their plants full and the consumption is heavier than at any time in nearly two years. The leading consumer of turnings and borings has pretty well used up the heavy tonnage bought some time ago, and is expected in the market again before long. The new owners of the light rail mill at Newark, Ohio, are actively in the market for rerolling rails, and the two mills at Cambridge, Ohio, and Huntington, W. Va., are also buyers. Prices on all grades of scrap are from 25c. to 50c. higher than last week, and we note that some dealers refuse to accept the prices here given. Dealers quote about as follows: Heavy steel scrap, $16.75 to $17; cast iron borings, $10.50 to $10.75; bundled sheet scrap, $15.25 to $15.50, delivered at consuming point; No. 1 cast, $15.75 to $16; No. 2, $14.75 to $15; No. 1 railroad malleable, $15.75 to $16. Sheet bar crop ends are scarce and higher, and we quote at $17 to $17.25. Low phosphorus melting stock is also scarce and has advanced sharply, dealers now holding it when running 0.04 and under in phosphorus at $21, and it looks as though it will be higher. Rerolling rails are firm at $17.50, delivered, Cambridge or Huntington. Steel axles are $21; grate bars, $13 to $13.50; old car wheels, $17; machine shop turnings, $12.50 to $12.75; locomotive tires, $17.75 to $18; locomotive axles, $26; iron axles, $25.50; No. 1 railroad wrought scrap, $17.50; No. 1 busheling scrap, $15, and stove plate, $12.25 to $12.50. All these prices are per gross ton, f.o.b. cars, Pittsburgh, unless otherwise noted. Bundled sheet scrap is strong and bringing higher prices in the East. Local dealers have sold upward of 5000 tons of bundled sheet scrap at $17, delivered, in the East for balance of the year shipment, carrying a freight rate of $2.20 from this district. We note sales of 3000 to 4000 tons of heavy steel scrap at $16.75 to $17, delivered at consuming points, also 350 tons of cast iron borings at $10.75 and 400 tons of rerolling rails at about $17.50, delivered.

A $58,000 contract for furnishing the Isthmian Canal Commission with car wheels has been awarded to the Maryland Car Wheel Company, Baltimore, Md.

Philadelphia.

PHILADELPHIA, PA., August 24, 1909.

The demand for both crude and finished materials continues on about an even basis. Finishing mills are booking about an average volume of business, fully equal to the present capacity of most of them. Pig iron for prompt shipment is scarce, the shortage in basic being particularly sharp. The bulk of the business transacted is of a spot nature, neither crude nor finished material makers being disposed to book orders for extended delivery, and in but very few cases have sales been made for deliveries extending beyond the year end. Railroads continue to show increased activity, both in the way of general improvements and purchases of rolling stock and equipment, and from present indications there is nothing in sight to interfere with the return of prosperous conditions in the near future.

Pig Iron.—The market has been a trifle more active. A larger aggregate tonnage has been done in the foundry grades, although basic transactions continue the feature of the market. Owing to delayed deliveries, steelmakers have felt the scarcity of prompt basic quite sharply and practically all available in this territory for early shipment has been picked up. Sales of two lots of Virginia basic, a total of 4400 tons, for delivery in the last three months of the year, are reported at $17.50, delivered, while several thousand tons of fairly prompt iron are reported at $17.45, delivered. The principal sale of basic during the week called for 24,000 tons, which was taken by an Eastern mill at $18, delivered, for shipment during the first half of 1910. Few sellers have any material tonnage of basic iron to offer for this year's delivery, and what there is appears to be held at $17.50, minimum. For shipment during the first half of next year $18 is being quoted by a number of sellers, who, however, are not anxious for business at that price, while others still refuse to name any quotations for forward delivery. Foundry grades have been advanced 25 cents a ton by a number of eastern Pennsylvania furnaces who now hold flatly at $17, furnace, for No. 2 X foundry for prompt shipment, and report scattered sales at that figure. Quite a variation, however, is noted in the quotations for this grade, much depending on the position of the seller as well as that of the customer. In some cases $17.25, delivered, can still be done for prompt No. 2 X in moderate lots, although $17.50 has probably been the figure at which the bulk of the business has been transacted. A few sellers have named prices for this grade in moderate lots for early 1910 shipment, ranging from $18 to $19, delivered during the first quarter, but the larger proportion of sellers still refuse to quote for such delivery. Sales during the week have been somewhat more active, and while the bulk of the business has been confined to lots ranging from carloads to a few hundred tons for reasonably prompt shipment, a few light sales for delivery extending into 1910 are reported. Virginia foundry grades have not been very active, sales of moderate lots for shipment during the next two months having been made at $17.25 to $17.50, delivered in this territory, the bulk of the tonnage at the lower level. For strictly fourth quarter delivery $18 has been named, but no business transacted. Virginia producers are still out of the market when iron for next year's delivery is to be considered. Southern foundry iron has not been marketed in any quantity in this territory recently, the current market price having been prohibitive in comparison with that of Northern brands. Low grade foundry grades are scarce; the cast iron pipe foundries would take considerable tonnage were it available, but very little comes out and prices are correspondingly high. Forge iron has been rather inactive, although prices, in the general move-up, have been advanced for some brands; very little tonnage has been sold. No particular movement in low phosphorus iron is noted and prices are unchanged. The position of the furnaces in this territory is exceedingly strong. At the meeting of the Eastern Pig Iron Association, held last week, reports showed that there had been a very material increase in orders and a further decline in stocks on the furnace banks. Plans are being made for the blowing in of a number of furnaces, and it is expected that at least eight more stacks will go in before the end of the year, which should relieve the situation to some extent. Deliveries on practically all grades are being urged by consumers, and in some cases are hard to meet. A decidedly optimistic view of the situation was taken and higher prices on nearly all grades are anticipated. Prices show a hardening tendency, and while the following range is named for standard brands, for prompt delivery in buyers' yards, eastern Pennsylvania and nearby points, an average of 50c. more a ton is being generally named for strictly fourth quarter shipment. Basic, however, is quoted for balance of the year delivery, with first half of 1910 shipment commanding an advance of 50c. a ton.

Eastern Pennsylvania, No. 2 X foundry	$17.25 to $17.75
Eastern Pennsylvania, No. 2 plain	16.75 to 17.25
Virginia, No. 2 X foundry	17.25 to 17.50
Virginia, No. 2 plain	16.75 to 17.00
Gray forge	16.00 to 16.50
Basic	17.50
Low phosphorus	20.50 to 21.00

Ferromanganese.—The market has developed some irregularity. Sellers have not yet gotten in line and quotations show considerable variation. A few inquiries have been before the trade, and while the majority of sellers name $43, Baltimore, for this year, and $45 for first half delivery, they claim to be unable to get business at these figures, there being other sellers still willing to shade these prices materialy.

Billets.—A good demand is noted and sellers report a fair volume of business, largely for prompt shipment, for which ordinary rolling steel commands $27, delivered in this territory. A fair volume of orders have also been taken for forward shipment at an advance of approximately $2 a ton, dependent on individual conditions. Forging steel is being more freely taken and is quoted at $29 for prompt delivery in this territory, the usual extras applying for high carbons and special shapes:

Plates.—The volume of business coming to the mills continues to hold about the same average. A slight betterment in the size of individual orders is reported, and some good tonnage is pending from car works and bridge and ship builders. Should the present activity continue, several mills will make new records for monthly tonnage of business taken. Prices are firm and unchanged, while 1.55c., minimum, for prompt carload lots continues to be quoted for desirable business, that of a miscellaneous character commands 1.60c., minimum, for delivery in this territory.

Structural Material.—Orders placed during the week have been individually small, although the aggregate is sufficient to keep the mills fully engaged. In some instances deliveries are less prompt for certain classes of shapes. Prices are firm and unchanged, and makers, as a rule, refuse to contract for extended deliveries. For fairly prompt shipment plain material delivered in this territory is quoted at 1.55c. to 1.65c., dependent on specification.

Sheets.—The demand for prompt deliveries has been quite brisk, and order books of the mills are rapidly assuming a very satisfactory shape. Mills are operating at full capacity. While prices for prompt shipment are unchanged, an advance of practically $2 a ton is asked for extended shipments. For prompt delivery the following quotations are named. Nos. 18 to 20, 2.40c.; Nos. 22 to 24, 2.50c.; Nos. 25 and 26, 2.60c.; No. 27, 2.70c.; No. 28, 2.80c.

Bars.—A fair volume of business comes out for prompt shipment, although mills could book extensive orders ahead at ruling quotations if they so desired. With a hardening market, however, the custom is to consider business of a prompt nature only. Prices are strong and refined iron bars range from 1.47c. to 1.52c., delivered in this vicinity. Steel bars are fairly active, at 1.45c. to 1.50c., for deliveries extending up to the end of the year.

Coke.—The movement has been rather light. Sales of foundry coke have been mostly in small lots for early delivery. Furnace coke is dull, but a betterment is expected as the active blast furnace capacity in this territory increases. For reasonably prompt delivery in buyers' yards in this territory the following prices are quoted:

Connellsville furnace coke	$3.90 to $4.10
Foundry coke	4.35 to 4.50
Mountain furnace coke	3.50 to 3.70
Foundry coke	3.80 to 4.10

Old Material.—The situation regarding heavy melting steel is rather complex. The associated steel mills claim to be getting practically all the tonnage they want, through their agent, at $17, delivered, and an embargo is now on at one of the mills, although outside sellers claim that as high as $17.50 will be paid by outside mills. The impression prevails in some instances that the importation of steel scrap will hold prices down, but it is contended that it is practically impossible to bring in the usual classes of heavy melting steel at the $1 duty under the present interpretation of the new scrap clause by the customs authorities. Quotations for heavy melting steel are therefor nominal at $17 to $17.50, with outside sellers holding for higher prices. Rolling mill scrap is firm but unchanged, sales as a rule being small individually. The market on the whole is very strong and large tonnages command higher prices. For reasonably prompt delivery in buyers' yards, eastern Pennsylvania and nearby points, the following range of prices is nominally quoted:

No. 1 steel scrap and crops	$17.00 to $17.50
Low phosphorus	20.00 to 21.00
Old steel axles	22.00 to 23.00
Old iron axles	24.00 to 25.00
Old iron rails	19.75 to 20.50
Old car wheels	16.00 to 16.50
Choice No. 1 R. R. wrought	19.50 to 20.00
Machinery cast	15.50 to 16.00
Railroad malleable	15.00 to 16.00
Wrought iron pipe	16.75 to 17.25
No. 1 forge fire scrap	15.00 to 15.50
No. 2 light iron	10.00 to 10.50
Wrought turnings	14.00 to 14.50
Stove plate	13.00 to 13.50
Cast borings	11.75 to 12.25
Grate bars	14.00 to 14.50

Cincinnati.

CINCINNATI, OHIO, August 25, 1909.—(*By Telegraph.*)

Specifications for all finished lines are coming in in good volume and more interest is manifested in coke. The feature of the pig iron market to-day is the report that two of the largest Southern interests have just opened their books for first quarter and half business. This is confirmed through an official statement that the report is true in a limited way. Inquiry for such business is taken up for consideration at headquarters, each specific case by itself. No open quotations are authorized. Foundry irons are leading in demand in this market. August will close satisfactorily with machine tool manufacturers. Some late business from automobile manufacturers and dealers will have a tendency to swell sales records of lathe and milling machine manufacturers to better than July proportions. Tool makers are looking forward to some business from late lists of the Illinois Central and Central of Georgia railroads.

Pig Iron.—Sales for spot shipment and remainder of the year have been good. One agency reports sales of 10,000 tons, mostly foundry, of which 1750 tons was for next year, all Northern. Tentatively, the price for first quarter Southern iron is $14, Birmingham, and that figure seems to be accepted as the basis, although $13.75 is being done. For standard Alabama irons nothing better than $13.50 for the remainder of the year seems available. For prompt shipment there appears to be still some Northern $15 iron, while $15.50 is asked for the last quarter and first quarter of next year. Others, more independent, are asking $15.75 to $16 for this delivery and second quarter. The few furnaces having stocks of forge are holding it for the winter market, which is confidently expected to appreciate in better proportion than higher grades. The range of asking prices on this iron is $11.50 to $12.50. Jackson County silvery producers are asking a premium of 50c. for next year, which will make 8 per cent.; $19 at furnace, for first half delivery. Several sales of malleable have been consummated at about $15.50, Ironton, but the latest inquiry, 1500 tons for first quarter from nothern Ohio, is reported deferred, believing a better price may be obtained later. An Ohio engine builder has bought 1000 to 1500 tons of Northern iron. A Michigan stove maker, who inquired for 7000 tons of foundry, running 1.75 and over, and 2.25 and over in silicon, and 0.80 to 1.25 in phosphorus, one-half each for the first half, is said to have contracted with a Detroit furnace. An inquiry for 2000 tons of silvery 4 to 5 per cent., for the same delivery, is now under negotiation with Southern furnaces. An Ohio stove maker is in the market for first quarter or half. An inquiry from Chicago territory asks for prices on 500 tons of No. 2 soft Southern for first quarter. An Ohio manufacturer makes an offer on 1000 tons each of an analysis iron, low grades, one requirement being a guarantee of 2.35 in silicon. Northern irons at present quotations have a better chance than Southern in territory north of Cincinnati, and these furnaces are rapidly cutting down their surplus. Ferromanganese is active, present asking prices ranging from $42 to $45, Baltimore, for the remainder of this year. For prompt shipment and remainder of the year, based on freight rates of $3.25 from Birmingham ane $1.20 from Hanging Rock, we quote f.o.b. Cincinnati as follows:

Southern coke, No. 1 foundry	$17.25
Southern coke, No. 2 foundry	16.75
Southern coke, No. 3 foundry	16.25
Southern coke, No. 4 foundry	15.75
Southern coke, No. 1 soft	$16.75 to 17.25
Southern coke, No. 2 soft	16.75
Southern coke, gray forge	15.00 to 15.50
Ohio silvery, 8 per cent. silicon	19.70
Lake Superior coke, No. 1	16.70 to 17.20
Lake Superior coke, No. 2	16.20 to 16.70
Lake Superior coke, No. 3	15.70 to 16.20
Standard Southern car wheel	22.25 to 23.75
Lake Superior car wheel	20.50 to 21.00

(*By Mail.*)

Coke.—Melters seem to be fairly well covered for the remainder of the year, but there is considerable inquiry for next year's delivery. Producers have not as yet opened their books for 1910, and seem to evidence an inclination to delay any kind of commitments until the labor and car shortage atmosphere may be clearer. Scarcity of labor is the chief cause for present apprehension. Consumers are taking coke on contract in good form. An inquiry from two northern Ohio furnace interests for prices covering their requirements for the first half is noted. This would aggregate about 30,000 to 35,000 tons per month. While prices show no material change, the market evidences gathering strength. Connellsville spot furnace coke ranges from $1.65 to $1.75 per net ton at oven, and standard foundry brands from $2 to $2.35 on specifications for the next 12 months. Shipments on existing contracts are good. Wise County furnace grades range from $1.70 to $1.85; Pocahontas furnace from $1.75 to $1.85.

Finished Iron and Steel.—The feeling is optimistic in all lines. No contracting is being done, and on less than carload lots of steel bars the price is rather uniformly 1.40c., Pittsburgh; 1.35c. is still available, however, in larger than carload shipments and within the limitations set by the mills which have not gained any on time for shipment and are reported to be rather losing ground in that regard. It is the opinion of the trade here that no prices for 1910 shipment will be available earlier than November. In structural material the quoted price of 1.40c. is advanced by most large producers to 1.45c. on less than carload orders. Some independent mills are said to be gathering considerable business at present quotations by promising deliveries in two to three weeks. The largest interest reports the heaviest shipments of sheets and tin plate last week through the local office for two years and a half. Prices quoted elsewhere on the Pittsburgh basis are being well maintained in this market. The steel for the Ohio Mechanics' Institute will be furnished by the McClintic-Marshall Construction Company, about 380 tons, although there will be a still heavier tonnage of ornamental shapes.

Old Material.—Dealers are not of a mind on prices this week, but all are preparing for a big fall opening and are looking over their stocks, filling up the weak spots. Some good sales have been made in Chicago and St. Louis territory. Nearly all local dealers have sold old car wheels, one sale of 1000 tons being reported at $15, gross ton, f.o.b. Cincinnati. Relayers are also stronger, a shipment of 5000 tons going to Texas via St. Louis at about $21.50, gross ton, and some other smaller ones at about the same price. No. 1 railroad wrought has also been a good seller, and in this item the spread is about $1.50 per ton, one sale of 3000 tons bringing about $17, gross ton, at Chicago. The following table shows about the range of prices made by dealers to the trade, and are f.o.b. Cincinnati:

No. 1 R. R. wrought, net ton	$14.50 to $15.00
Cast borings, net ton	7.00 to 7.50
Heavy melting steel scrap, gross ton	14.00 to 14.50
Steel turnings, net ton	8.50 to 9.00
No. 1 cast scrap, net ton	14.00 to 14.50
Burnt scrap, net ton	10.00 to 10.50
Old iron axles, net ton	18.50 to 19.00
Old iron rails, gross ton	15.75 to 16.25
Old steel rails, short, gross ton	14.00 to 14.50
Old steel rails, long, gross ton	15.00 to 15.50
Relaying rails, 56 lb. and up, gross ton	21.50 to 22.00
Old car wheels, gross ton	14.50 to 15.50
Low phosphorus scrap, gross ton	14.00 to 14.50

St. Louis.

ST. LOUIS, August 23, 1909.

The heavy expenditures on the part of the city of St. Louis and the United Railways for buildings, street improvement and track laying, are an important aid to activity in local business. It is estimated that city building this year and next will reach the sum of $8,000,000. The street railroad is reconstructing 30 miles of its lines, giving employment to 2500 men. The company is also building a large number of new cars. Many of these cars cost $6500 each, and are constructed of steel. According to the official figures of the State Auditor, the valuation for this year's taxes will be very close to $1,615,000,000.

Coke.—The market is growing stronger under a somewhat better inquiry and the knowledge that consumers are making increasing inroads on their supplies through the improvement in the iron trade. As labor is becoming scarce it may affect the coke output later on. At the same time attention is required more to filling contracts than booking new business. The largest transaction reported is a sale of 4500 tons, 3500 of which is for shipment over the balance of 1909 and 1000 is for shipment over the first quarter of 1910. With some offices the demand is mainly for prompt shipment. Difficulty and shipping out coke is being experienced and producers are requiring at least a week's notice. We report previous quotations: 72-hr. standard Connellsville for prompt shipment or delivery over balance of 1909, $2.25; for shipment over one year, $2.35; for first half of 1910, $2.50, all per net ton at oven.

Pig Iron.—The demand continues fairly active, counting all kinds, though business in Southern is checked somewhat by the firmer views of furnacemen and the fact that, in case of some of the companies, new contracts are refused for the present. A feature of the market is an increase in the inquiry for 1910 shipment, together with, in some instances, urgent requests for having the contract time anticipated. A canvass of the various offices develops both sales and inquiries, among which are the following: An inquiry for 1500 to 1800 tons; a sale of 6500 tons, of which 5500 tons is for shipment over the balance of this year and 1000 tons over the first quarter of 1910. The representative of a leading Southern producer reports a sale of upward of 7000 tons during the past three weeks, and that no more business will be booked until advised. A leading sales agency reports an inquiry for 500 tons of malleable Bessemer for shipment over the balance of the year, 2000 tons for shipment over six months, and a sale of 1000 tons to a manufacturer of agricultural implements, together with sales of various kinds of iron, aggregating 5000 tons, in lots of 400 to 500 tons. Another officer reports an inquiry for 3000 tons of malleable and 2000 tons of basic. All sellers name $13.50, Birmingham, as the market for No. 2 Southern

foundry, for shipment prior to January, 1910. For shipment over the first quarter of 1910, it is reported that a furnace will book a limited quantity at $13.75, but merchant sellers ask $14 for standard iron. A growing delay in filling orders is complained of, partly from lack of cars and to some extent from furnaces being behind on orders. Northern basic and malleable are held at $15.50 at Ohio furnaces for balance of 1909 and $16 for 1910.

Lead, Spelter, Etc.—Lead is very firm at 4.30c., St. Louis. Spelter is strong at 5.70c., and in good demand. At Joplin, the market is still excited and zinc ore is in demand at $51 per ton, Joplin base.

Old Material.—Dealers report an active demand for scrap iron and steel, with more inquiry from foundries than from mills. Stocks, though reduced somewhat, are still quite large. The entire list is firm, with slightly higher prices asked for some items. There are no railroad offerings on the market for the week. We quote dealers' prices, per gross ton, f.o.b. St. Louis, as follows:

Old iron rails	$16.00 to $16.50
Old steel rails, rerolling	15.50 to 16.00
Old steel rails, less than 3 ft	15.00 to 15.50
Relaying rails, standard sections, subject to inspection	24.50 to 25.00
Old car wheels	17.00 to 17.50
Heavy melting steel scrap	15.00 to 15.50
Frogs, switches and guards, cut apart	15.00 to 15.50

The following quotations are per net ton:

Iron fish plates	$13.75 to $14.25
Iron car axles	19.50 to 20.00
No. 1 railroad wrought	14.50 to 15.00
No. 2 railroad wrought	14.75 to 15.25
Railway Springs	13.75 to 14.25
Locomotive tires, smooth	14.00 to 14.50
No. 1 dealers' forge	11.00 to 11.50
Mixed borings	7.00 to 7.50
No. 1 boilers, cut to sheets and rings	10.50 to 11.00
No. 1 cast scrap	13.50 to 14.00
Stove plate and light cast scrap	10.50 to 11.00
Railroad malleable	13.00 to 13.50
Agricultural malleable	12.00 to 12.50
Pipes and flues	10.50 to 11.00
Railroad sheet scrap	9.00 to 9.50
Railroad grate bars	10.50 to 11.00
Machine shop turnings	8.50 to 9.00

The Kellermann Contracting Company, St. Louis, bidding $729,000 to build an addition on the City Hospital, made the lowest figure and probably will be awarded the contract by the Board of Public Improvements.

The Elliott Frog & Switch Company, East St. Louis, expects to be obliged to put on a night force by September 1.

Buffalo.

BUFFALO, N. Y., August 24, 1909.

Pig Iron.—The aggregate tonnage of orders placed with Buffalo District furnaces the past week from territory tributary to this market has been large. They comprised both foundry grades and malleable, but were made up almost wholly of carload to 500 and 600 ton lots and chiefly for early delivery. Shipments on contracts have been very heavy. Inquiries totalling 40,000 to 50,000 tons, for all deliveries, balance of the year and future, principally for first quarter, have been received during the week from consumers wanting, without paying too much, to get under cover for expected requirements, as the conclusion seems general that selling prices are about to advance. Costs are already advancing, so that present prices are not satisfactory to the producer, and the furnaceman must consequently get more for his product. The question of increased cost is one of the restraining influences making the furnacemen loath to fill up their order books for future deliveries at prices at present obtainable. The supply of basic is scanty and prices are higher. Prices of other grades for delivery over the balance of year are very firm and stiffening. We quote as follows, for prompt and fourth quarter delivery, f.o.b. Buffalo:

No. 1 X foundry	$16.00 to $16.75
No. 2 X foundry	15.75 to 16.50
No. 2 plain	15.25 to 15.75
No. 3 foundry	15.00 to 15.25
Gray forge	14.75 to 15.00
Malleable Bessemer	15.50 to 16.00
Basic	16.50 to 16.75
Charcoal	19.50 to 20.00

Finished Iron and Steel.—One of the independent interests has this week advanced the price of steel bars to 1.40c., base, Pittsburgh, and for plates and structural shapes to 1.45c., Pittsburgh. Others are, however, still holding at 1.35c. and 1.40c., respectively. All mills and agencies report inquiries and orders in large volume. From present indications the aggregate tonnage of orders booked for August will exceed the large tonnage for July. Some announce inability to make deliveries under 60 to 90 days, but report that a good many orders are being booked on these extended deliveries. In structural material orders continue heavy for fabricated work. The Buffalo Structural Steel Company has received the contract for fabricating and erecting the steel for the James H. Byers commercial building, 400 tons, the steel to be furnished by the Lackawanna Steel Company. Bids will be closed this week for the steel for the addition to the Phoenix Brewery, 100 tons, and specifications will soon be ready for bids for the steel for large addition to the plant of the United States Rubber Reclaiming Works, Buffalo.

Old Material.—The demand from consumers has been a good deal better the past week than for some time previous, especially for heavy melting steel, turnings and borings, and prices on these items have advanced considerably. There has been increased inquiry in other lines, but no sales of consequence, as holders are reluctant to sell at current prices, feeling that they will be able to realize more money within the next 30 or 60 days. We quote dealers' prices per gross ton, f.o.b. Buffalo, as follows:

Heavy melting steel	$16.00 to $16.50
Low phosphorus steel	19.00 to 19.50
No. 1 railroad wrought	16.00 to 16.50
No. 1 railroad and machinery cast scrap	14.75 to 15.00
Old steel axles	19.00 to 19.50
Old iron axles	21.75 to 22.25
Old car wheels	15.00 to 15.50
Railroad malleable	14.75 to 15.25
Boiler plate	13.75 to 14.25
Locomotive grate bars	12.00 to 12.50
Pipe	12.25 to 12.75
Wrought iron and soft steel turnings	9.75 to 10.25
Clean cast iron borings	8.25 to 8.75
No. 1 busheling scrap	13.00 to 13.50

Birmingham.

BIRMINGHAM, ALA., August 23, 1909.

Pig Iron.—The sales for the past week aggregate some 15,000 to 20,000 tons. A very brisk demand has been experienced and the business transacted has come from the foundry trade generally. The most significant purchases were made by cast iron pipe manufacturers, which interests probably engaged fully 50 per cent. of the aggregate commitments. Current quotations have not changed since last report, but the status of values is considered slightly higher. Such a condition is due to the fact that iron heretofore available at slight departures from the established schedule by reason of special conditions has been disposed of. The schedule of $13.50, Birmingham, for No. 2 foundry is now applicable to prompt shipments and deliveries covering the remainder of the year with the market firm at that price. Quotations of $14 have been submitted on limited quantities for delivery during the first quarter, but no commitments for that period are reported. Of the inquiries pending for 1910 deliveries, a pipe manufacturer is in the market for 5000 tons to cover the first half, a manufacturer of stoves desires quotations on 3500 tons for the first quarter, and a pipe manufacturer requires 3000 tons for the first quarter. Intimations by leading producing interests that no commitments for this year will be carried over are more frequent, and as a result the movement from furnace yards has been considerably augmented. The inability to obtain spot shipments from furnace companies has been reported in several cases, and that demand is being met largely by merchants. So far no premium prices for spot are recorded, although low grades for early shipment have brought better figures than a differential of 50c. per ton on a No. 2 basis. An advance in charcoal iron has been effected and chilling grades are quotable at from $20.50 to $21, with nonchilling grades available at $20.

Cast Iron Pipe.—Local producers have not changed quotations, notwithstanding the comparatively slight demand. It is conceded that the extensions and improvements to water works systems soon to be under way will be equal to expectations in every respect, while the gradual increase in cost of raw material must of necessity result in higher prices for the finished product than are now being asked. A fair aggregate of small orders was placed during the past week, but no large contracts are yet in sight for early letting. The entire active capacity is being operated on orders previously booked and no stocks are in evidence. We quote water pipe as follows, per net ton, f.o.b. cars here: 4 to 6 in., $26; 8 to 12 in., $25; over 12 in., average $24, with $1 per ton extra for gas pipe. These quotations are in the main nominal, by reason of the lack of a demand for round tonnages.

Old Material.—A contract to cover 250 tons of light cast is the most significant transaction reported during the past week. The price of heavy steel scrap has been advanced, but prices for other grades are unchanged, with the demand sufficient to warrant their maintenance in each case. Dealers continue to add to their stocks whenever practicable, although the aggregate accumulation in evidence is comparatively insignificant. We quote dealers' asking prices as follows, per gross ton, f.o.b. cars here:

Old iron rails	$15.00 to $15.50
Old iron axles	15.50 to 16.00
Old steel axles	12.50 to 13.00
No. 1 railroad wrought	13.00 to 13.50
No. 1 railroad wrought	11.00 to 11.50
No. 1 country wrought	10.00 to 10.50
No. 2 country wrought	9.50 to 10.00
No. 1 machinery	11.50 to 12.00
Tram car wheels	11.00 to 11.50
Standard car wheels	12.50 to 13.00
Light cast and stove plate	10.50 to 11.00
No. 1 steel	11.00 to 11.50
Cast borings	5.50 to 6.00

Metal Market.

NEW YORK, August 25, 1909.

Copper.—While there has been some steady buying of copper the past week, the market is not particularly active, no large orders being reported. Prices have declined somewhat, and sales of electrolytic have been reported at 13.12½c. Very little is offered at that figure, however, and most sellers are asking 13.25c. Lake copper is firm at 13.50c. A good buying movement would probably advance prices slightly, and it is not thought that they will go any lower in the immediate future. The London market is firmer than it was at the time of last week's report, and to-day prices there are £59 11s. 3d. for spot and £60 10s. for futures. The exports of copper are not so heavy as they were last month, and up to date 16,528 tons have been sent abroad during August.

Pig Tin.—A good business has been done in pig tin, and the market has a more cheerful tone than has existed in several weeks past. Prices have an upward tendency and some very good transactions in futures have been made. The situation begins to look bad for the consumers, as indications are that August and September tin will be scarce. The arrivals so far this month have been 2896 tons. The steamer Minnewaska, which is due August 31, is carrying 380 tons, and there are 768 tons of tin afloat on steamers unknown. The stocks amount to 2366 tons, which makes the available tin at the end of the month about 5642 tons. Business in sight indicates that a good part of this will be taken up and it is highly probable that prices will advance. During the week the following prices were established:

	Cents.
August 18	30.05
August 19	30.05
August 23	30.20
August 23	30.55
August 24	30.45

In London to-day tin was sold for £137 17s. 6d. for spot and £139 for futures.

Lead.—Firmer prices have been established for lead, and although the demand is light sellers are offering no inducements in the way of shading. All of the lead offered at resale has been taken from the market, and the American Smelting & Refining Company is asking 4.40c., New York, while outside interests are demanding 4.42½c.

Spelter.—The sharp advance in the price of spelter is being well maintained, and, considering the fact that manufacturers were making little, if any, profit on the prices which prevailed three weeks ago, it is not thought that the metal will go down. There has been some fairly good purchasing, and while some sales have been reported as low as 5.75c., the large sellers are generally asking and getting 5.85c., New York, and 5.70c. at St. Louis.

Antimony.—The market is featureless. Quotations are as follows: Cookson's, 8.50c.; Hallett's, 8c., and other brands, 7.25c. to 7.50c.

Aluminum.—There has been something of a flurry in the foreign market for aluminum, and sellers here have steadily advanced their prices during the last few days. They are now asking 24c. per pound for the metal, which brings it up to the present ruling price of domestic aluminum. It is stated that business troubles among manufacturers abroad have curtailed production to some extent, and the metal is getting rather scarce.

Tin Plates.—An advance of 15c. per box on tin plate for next year's delivery is looked for, but at present the prices remain unchanged. Quotations for 100-lb. IC. coke plates for delivery this year are $3.64 per box.

Sheet Zinc.—It would not surprise the trade if sheet zinc again advanced as a result of the high price of spelter. At present the advance which went into effect on the 14th inst. prevails, which is $7.50 per 100 lb. basis, with the usual discount, f.o.b. cars at the works.

Old Metals.—The following dealers' selling prices represent the New York market:

	Cents.
Copper, heavy cut and crucible	12.50 to 12.75
Copper, heavy and wire	12.25 to 12.50
Copper, light and bottoms	11.25 to 11.50
Brass, heavy	9.00 to 9.25
Brass, light	7.00 to 7.25
Heavy machine composition	11.25 to 11.50
Clean brass turnings	8.00 to 8.25
Composition turnings	9.50 to 9.75
Lead, heavy	4.10 to 4.15
Lead, tea	3.75 to 3.80
Zinc scrap	3.75 to 3.87½

The National Roll & Foundry Company Now Running.—Operations were commenced last week in the foundry and machine departments of the National Roll & Foundry Company, Avonmore, Pa. The first heat was made in the 15-ton furnace on Saturday. A contract for an additional 15-ton air furnace has been let to Wm. Swindell & Brothers, Pittsburgh, for early completion. The line of rolling mill equipment, including roll lathes, shears of all kinds, hot saws, &c., manufactured in the past by the Geo. A. Hogg Iron & Steel Foundry Company, Pittsburgh, will hereafter be made by the National Roll & Foundry Company. The latter has taken over all patterns for the manufacture of this equipment and announces that it is prepared to furnish duplicate parts for any Hogg machinery that requires renewal.

Iron and Industrial Stocks.

NEW YORK, August 25, 1909.

In sympathy with the sharp slump in railroad stocks, nearly all iron and industrial stocks declined sharply last week, generally striking the low point on Friday. A sharp recovery then set in, the leaders in which were the railroad equipment stocks. These stocks were most favorably influenced by announcements of contracts which were being closed by railroad companies for large numbers of cars and locomotives. The range of prices on active iron and industrial stocks from Thursday of last week to Tuesday of this week was as follows:

Allis-Chalm., com..	15⅛- 15⅞	Pressed St., pref...	104 -107½
Allis-Chalm., pref..	52½- 54⅛	Railway Spr., com.	47 - 50½
Beth. Steel, com..	31¼- 33⅝	Republic, com.....	36⅝- 39
Beth. Steel, pref..	63⅝- 65½	Republic, pref.....	104½-106
Can, com.....	12¼- 13	South. I. & S., com.	18⅞- 20¼
Can, pref.....	82⅝- 84	South. I. & S., pref.	54⅝- 55¾
Car & Fdry, com..	64¾- 68	Sloss, com.....	82⅞-*86
Car & Fdry, pref..	119 -119½	Pipe, com.....	32½- 32¾
Steel Foundries....	56¼- 60	Pipe, pref.....	85¼-*85⅞
Colorado Fuel.....	41¾- 46½	U. S. Steel, com...	73¼- 78⅜
Gen. Electric.....	165¾-169½	U. S. Steel, pref..	123¼-125⅝
Gr. N. ore cert....	81 - 83¼	Westinghouse El...	84 - 88
Int. Harvester, com.....	89¼	Chi. Pneu. Tool...	30⅛- 33½
Int. Harv., pref...	120¾-121½	Am. Ship, pref....	108 -110
Int. Pump, com...	39⅞- 43½	Cambria Steel.....	42⅜- 44½
Int. Pump, pref...	85¼- 88¼	Lake Sup. Corp....	26½- 28⅞
Locomotive, com...	60½- 63½	Warwick	9 - 9½
Locomotive, pref..	116½-118	Crucible St., com..	12½- 14⅛
Nat. En. & St.,com.	16¾- 17½	Crucible St., pref..	78 - 82
Pressed St., com...	48 - 51	Harb.-W. Ref., com.	31½- 32

* Ex dividend.

Last transactions up to 1.30 p.m. to-day are reported at the following prices: United States Steel common 76½, preferred 124½, bonds 106⅝; Car & Foundry common 66⅝, preferred 119; Locomotive common 60, preferred 117; Steel Foundries 59½; Colorado Fuel 45¼; Pressed Steel common 50½, preferred 105; Railway Spring common 49¾; Republic common 38, preferred 105½; Sloss-Sheffield common 85; Cast Iron Pipe common 32½, preferred 85¼; Can common 12¾, preferred 83¼.

Iron and Steel Bonds.

Chisholm & Chapman, 18 Wall street, New York, furnish the following quotations:

	Bid.	Asked.
Bethlehem Steel 1st ext. 5s, due January, 1926	88½	89⅜
Bethlehem Steel purchase money 6s, August, 1998	117	118
Buffalo Iron 5s, October, 1925	95	100
Buffalo & Susquehanna Iron 1st 5s, June, 1932	99¾	..
Buffalo & Susquehanna Iron deb. 5s, January, 1926	94	..
Dominion Iron & Steel 5s, July, 1929	96	97½
La Belle Iron 1st 6s, December, 1923	104½	..
Lackawanna Steel 1st 5s, April, 1923	98½	99
Maryland Steel 1st 5s, February, 1922	102	103
Pennsylvania Steel 1st 5s, November, 1917	102	..
Pennsylvania & Maryland Steel 6s, September, 1925	..	110½
Republic Iron & Steel 1st 5s, October, 1934	101	102
Sloss Iron & Steel 1st 6s, February, 1920	106	108½
Sloss Iron & Steel consol. 4½s, April, 1918	94½	97
Jones & Laughlin 1st 5s, May, 1939	102¼	102¾
United States Steel Corporation.		
Collateral Trust 5s, Series A, C, E, April, 1951	114⅜	115¼
Collateral Trust 5s, Series B, D, F, April, 1951	114⅜	115½
Sinking Fund 5s, April, 1963	106	106⅛
Union Steel 1st 5s, December, 1952	105	106
Clairton Steel 5s, 1908-1913	101	..
St. Clair Furnace 1st 5s, 1910-1939	101	..
St. Clair Steel 1st 5s, 1908-1926	101	..
Illinois Steel deb. 5s, January, 1910	100¼	..
Illinois Steel 5s, April, 1912	100¼	..

All bonds quoted "and interest."

The Westinghouse Electric & Mfg. Company, although only about eight months out of receivers' hands, is preparing to pay off the accumulated dividends on its first preferred stock, amounting to 12½ per cent., and resume the quarterly disbursements on this issue, at the rate of 7 per cent a year, which have been discontinued since October, 1907. There is approximately $4,000,000 of this stock outstanding, which not only carries cumulative dividends of 7 per cent. a year, but has the right to participate equally with other stock after the latter shall have received 7 per cent. It also enjoys priority as to assets.

Dividends.—The Republic Iron & Steel Company has declared the regular quarterly dividend of 1¾ per cent. on the preferred stock, payable October 1.

The third dividend of $1 a share on the Great Northern Ore certificates has been declared payable September 15. Since the Great Northern Railroad trusteed its holdings of iron ore lands to the United States Steel Corporation a $1 disbursement on the certificates has been declared every

year. The other two dividends were paid September 16, 1907, and March 16, 1908.

The Railway Steel Spring Company has declared the regular quarterly dividend of 1¾ per cent. on the preferred stock, payable September 20.

New York.

NEW YORK, August 25, 1909.

Pig Iron.—Active inquiry for pig iron for 1909 delivery from foundries in eastern New York and a number of New England points set in last Thursday, and sales in considerable volume have been made in each succeeding business day. An important electric interest has been a buyer, as well as a large locomotive company. A number of lots from 3000 to 6000 tons are included in the total. Buffalo, eastern New York and New Jersey furnaces have taken the bulk of the business. Buffalo prices have advanced to $15.75 and $16, at furnace, for No. 2, the freight to New York, Brooklyn and New England points being $2.45. Some eastern Pennsylvania furnaces are now quoting $17, at furnace, for No. 2 X. Five or six additional furnaces, producing basic or foundry iron, will be blown in soon, or have gone in in the past week in New Jersey and eastern Pennsylvania. We quote Northern No. 1 foundry, $18 to $18.25; No. 2 foundry, $17.50 to $17.75; No. 2 plain, $17 to $17.25. Alabama iron is quoted $18.25 to $18.50 for No. 1, and $17.75 to $18 for No. 2.

Steel Rails.—Several lots of Bessemer rails from specially treated steel are under negotiation. The Maryland Steel Company has sold 12,000 tons to the Southern Railway, of which 4000 tons are for prompt delivery and the balance through the remaining months of the year.

Structural Material.—The contract for the New York, West Chester & Boston elevated track and bridge work, 20,000 to 22,000 tons, is reported to have been awarded to the American Bridge Company. The fabricated steel for the Twenty-second Regiment armory, 1200 tons, will be furnished by the Pennsylvania Steel Company. A considerable tonnage of structural steel and bars, as well as of plates, will be required for the two new 26,000-ton battleships, for which bids were opened at Washington last week. The volume of new inquiry in structural steel is lighter than for some weeks. Prices for plain material are firm, on the basis of 1.56c., New York delivery, on shipments from mill, while 1.61c. is being asked by some mills.

Ferroalloys.—There have been some good sales of ferromanganese, aggregating about 3000 tons, and prices are firm. We quote $43 to $44 for ferromanganese, delivered in New York for this year's delivery, and $43.50 to $44.50 for next year's. For 50 per cent. ferrosilicon we quote $63 to $63.50, New York, duty paid.

Bars.—The feature of the bar trade is the continuous demand for twisted steel bars for concrete reinforcement. This development in modern construction is making a heavy draft on the current output of the steel bar mills. Prices of steel bars are firmly held at 1.51c. to 1.56c., tidewater. The trade in bar iron is spasmodic, periods of activity being followed by stretches of comparative dullness. Prices are not uniformly maintained, as the smaller mills make concessions when they need work, and as soon as they receive fair orders withdraw from the market and buyers then find a firm front all along the line. Ordinary bars in full assortment are quoted at 1.50c., tidewater, while bar iron made to railroad specifications is held at 1.60c.

Cast Iron Pipe.—The city of New Bedford, Mass., which opened bids August 17 on 6513 tons of water pipe, awarded the contract to the Warren Foundry & Machine Company. There were two bidders. The city of New York awarded a contract on August 19 for pipe laying for the Borough of Richmond, Staten Island, which will call for about 5000 tons of water pipe, which, it is understood, will be furnished by the United States Cast Iron Pipe & Foundry Company. The general demand for pipe is steadily improving, although no important lettings are at present in sight in this immediate locality. The Eastern foundries are getting quite well filled with work, running into or through the winter months, and prices are steadily stiffening. One of the leading companies is now naming $25.50 per net ton as its lowest price on carload lots of 6-in., at tidewater, but the others have not yet come up to this rate and are still quoting $23.50 to $24. The improved condition of the trade and the increasing cost of pig iron are expected to bring up the lowest sellers very shortly.

Old Material.—The interest in the old material market continues to center in heavy melting steel scrap. The price of this commodity in the East is to some extent influenced by the advancing price and growing scarcity of basic pig iron. It may also be influenced by the heavy demand which has arisen in the Pittsburgh District and which may draw off in that direction some of the supplies of steel scrap that would naturally seek a market in eastern Pennsylvania. Some of the associated companies in the combined buying arrangement are running short of supplies, indicating that difficulty has been encountered in getting enough steel scrap in this way to keep requirements well covered. Eastern Pennsylvania works outside of the associated companies are offering $17, delivered. It is probable that steel scrap consumers near the seaboard will have their supply enlarged by imports, as a considerable quantity is understood to have been received here last week, and another good sized cargo is on the way. The demand from rolling mills continues excellent and prices are well maintained. Foundry scrap is strong, the demand being especially heavy for old car wheels. Cast borings are in brisk demand. An active trade has sprung up in rerolling rails, which were quiet for a long time. Relaying rails continue active. Quotations are as follows per gross ton, for delivery in New York and vicinity:

Rerolling rails	$16.00 to $16.50
Old girder and T rails for melting	14.50 to 15.00
Heavy melting steel scrap	14.50 to 15.00
Relaying rails	23.00 to 24.00
Standard hammered iron car axles	21.50 to 22.00
Old steel car axles	19.00 to 19.50
No. 1 railroad wrought	16.50 to 17.00
Iron track scrap	14.50 to 15.00
No. 1 yard wrought, long	14.50 to 15.00
No. 1 yard wrought, short	13.50 to 14.00
Light iron	8.50 to 9.00
Cast borings	9.00 to 9.50
Wrought turnings	10.50 to 11.00
Wrought pipe	13.00 to 13.50
Old car wheels	15.00 to 15.50
No. 1 heavy cast, broken up	14.00 to 14.50
Stove plate	12.00 to 12.50
Locomotive grate bars	12.00 to 12.50
Malleable cast	15.00 to 15.50

Judicial Decisions of Interest to Manufacturers.

ABSTRACTED BY A. L. H. STREET.

Patents — Limitation of Claims — Infringement — Time Recorders.—A claim is not to be defeated because it is broad in its language, when it is limited by the specifications and is susceptible to limitation. The remedy for a mistaken limitation in the claims of a patent is by a reissue and not by construction. The Dey patent, No. 786,011, claims 35, 54, 60-64, inclusive, for an improvement in workmen's time recorders, which consists generically in adding to the prior clock-controlled time recorder, having automatically actuated time-printing mechanism, automatic time-controlled "means adapted to print regular records in a certain color and irregular records in a certain other color"; regular records being those made when a workman enters or leaves at the regular time, and irregular records those made when he enters or leaves after or before the regular time—are limited to means by which the record itself, that is, the impression of the figures or letters which record the time, is printed in different colors, and are not infringed by a machine by which all records of time are printed in the same color, but which indicates an irregular record by an extra mark printed in a different color, especially in view of the limitations imposed upon the patent by the prior art, which includes means for printing extra characters. Patents cover the means employed to effect results, and to be an infringer one must not only reach the same result, but he must reach it by the same or substantially equivalent means. (United States Circuit Court, Northern District; Dey Time Register Company *vs.* W. H. Bundy Recording Company, 169 Federal Reporter 807.)

Patents—Infringement—Engraving Machine.—The Chase patent, No. 717,680, for a machine for engraving metal blanks, was not anticipated and discloses invention; nor is it void on the ground of prior public use of the machine, nor that the patentee was not the original inventor. (United States Circuit Court, Eastern District, New York; William A. Force & Co. *vs.* Bates Machine Company, 169 Federal Reporter 647.)

Patents—Infringement.—The substitution of a cam for a toggle joint in a patented mechanical combination does not avoid an infringement, where the two have the same purpose in the combination and effect it in substantially the same manner. (United States Circuit Court of Appeals, Third Circuit; Westinghouse Electric & Mfg. Company *vs.* Cutler Electric & Mfg. Company, 169 Federal Reporter 634.)

Patents—Woven Wire Fence.—The validity of a patent for a product or structure is not affected by the process or means by which it is made or whether it is made by hand or by machinery. The Bates patent, No. 561,193, for woven wire fencing, having parallel strand wires and a series of single plain stay wires connecting the strand wires by being coiled at their end portions around the strand wires and intercoiled at their meeting ends, and in one form having the spaces between both the strand wires and stay wires graduated so as to form graduated meshes, in view of the prior art, is void for lack of invention. (United States Circuit Court of Appeals, Eighth Circuit; American Steel & Wire Company *vs.* Denning Wire & Fence Company, 169 Federal Reporter 413.)

The Industrial Attraction of Niagara Power.

TORONTO, August 21, 1909.—It has been announced by the Reeve of Chippewa that a plant is to be located in that town by the Electrical Products Company of Niagara Falls, N. Y. Five acres of land has been acquired for a site, and it is stated that building operations will be begun as soon as the necessary by-law has been approved by the ratepayers; it is to be submitted to the qualified voters next month. The plant is to be the largest of its kind in the province. Electrical energy for the use of the company is to be supplied by the Ontario Power Company. Of this project nothing further can be said until it gets into a more concrete form.

The prospect for a great development of manufacturing industry in the Niagara peninsula seems extremely bright. Two of the power companies whose plants are in the vicinity of the Falls have extensive holdings of land, acquired for the purpose of subdivision and sale or lease as sites for plants to be operated by electricity from the works of the proprietary power companies. In the past very favorable terms were held out to manufacturers to establish themselves upon locations within these holdings, but the time was not yet ripe for any considerable demand for sites there. First, the economy of substituting hydro-electrical energy for more familiar forms of power was not yet a matter of sufficient practical demonstration to satisfy manufacturers whose experience was acquired by the use of fuel-produced power. Second, the difficulty of building up a new labor center was in the way, especially in the period of prosperity ending in 1907, when labor at any center was very scarce. Canadian manufacturers have learned that it takes something more than industrial works to make a place a center of attraction for wage earners. No matter how steady the employment or how liberal the pay, a place will not be favored by workers if it is remote from cities or if it is without the means of public amusement and recreation usually to be found in cities. It was complained that men were hard to get for paper mills, mining camps and railroad building operations because of the absence of enlivening pastimes in the hours after work. Some foreigners are willing to take work at isolated points, but these are seldom skilled mechanics. A third condition that tended to delay the development of industrial enterprise upon lands about the power plants at Niagara Falls was the recent lack of money for any new undertakings whatever.

On the Niagara frontier none of these conditions has now the same force it once had. Population is growing more dense there, towns like Welland, Thorold and Bridgeburg are gathering industries, and labor tends to gravitate thereto more than it formerly did. Electrical energy as a working force in factories is far past the experimental stage, and its comparative economy is now easily calculable. Capital, so far from shunning Ontario, is more partial to it than at any other time in the history of the province. Nor is it only to public borrowers and to railroad companies that British investors are opening their purses. They are putting their money into good industrial ventures, and seem particularly inclined to such as are worked by the widely advertised cheap power of Niagara. In advertising, the Ontario Government—or to speak more precisely the Government's Hydro-Electric Power Commission—has taken the leading part, as it was the borrower of the money required for carrying out the great scheme of transmitting Niagara power to municipalities.

The realizing of this scheme was attended by no small amount of friction, which kept the Government more or less to the front presenting the advantages of its arrangements. In fact, the Government has given such convincing pledges that it can furnish power to towns and cities within a radius of 75 miles of Toronto at prices less than half now charged that many not previously favorably disposed to electricity are now satisfied that its use means a real saving in the cost of operation. There is also a disposition to reason that, if the price of electricity at the works plus the cost of transmission to a point many miles distant is much less than the cost of fuel produced power, then the price of electricity at the point of production minus the charges for transmission must be still more attractive. Hence, there is an inclination to prefer the Niagara vicinity to points distant therefrom as the place for industries using electricity produced there.

Works in which electricity can be employed, not merely as a motive force but also as a process agency, will be most naturally inclined to seek the hydro-electrical power center itself. Now that not only the feasibleness but also the economy of smelting iron and making steel by electricity has been proved it is to be expected that works for such utilization of electricity will be drawn to the Niagara peninsula, where hydro-electrical power is to be had at very low prices and where raw material can be laid down at the lowest transportation cost. Further, as bearing upon all kinds of manufacturing industry that can be carried on there, the Niagara peninsula is peculiarly favorably situated to benefit by the overflow of American capital into border towns of Ontario. It is to be remarked that this overflow is showing signs of a new and stronger set toward Canada. C. A. C. J.

The Mexican Iron and Steel Company.

The Consolidated Securities Company, Boston, states that a syndicate which it represents has purchased the property known as "Ferreria de Tula," State of Jalisco, Mexico, on the Colima branch of the National Railways of Mexico, about 75 miles west of the city of Guadalajara. The property is said to contain 400 square miles of oak and pine forests. The iron ore thus far found shows on an analysis of six average samples by Charles Gibson, Chicago, 55.35 per cent. metallic iron, 79.07 per cent. ferric oxide and 12.92 per cent. silica. Phosphorus, sulphur, lime and magnesia are reported as absent. It is stated that iron has been manufactured on the property at intervals for over 200 years.

A corporation called the Mexican Iron & Steel Company, capital $5,000,000, will take over and operate the property. It will build a blast furnace and a plant to manufacture high grade steel. A number of kilns for the manufacture of charcoal will be built with a by-product recovery plant. The promoters of the enterprise state that it will first use traction engines, and as soon as the tonnage will justify it will build a railroad. The water power on the property will be developed to operate the mills. Several specialties will be manufactured.

New Publication.

Directory of Directors in the City of New York.—Publisher, the Audit Company, 165 Broadway, New York. Cloth; 860 pages. Price, $5 per copy.

This is the tenth edition of a work which has grown in interest and value every year, being now regarded as one of the standard business books of reference. This edition contains the names of over 32,000 directors, each director's name being followed by the name of the firm or company with which he is directly associated and then by all the companies in which he is a director. Selected list of corporations in banking, insurance, transportation, manufacturing and other lines of business, alphabetically arranged, accompanied in each case by the names of the company's officers and directors, are to be found in the appendix, as well as a list of the principal exchanges in New York, with their officers and managers.

Heavy Iron Ore Shipments from Minnesota.—On a recent day the Duluth, Missabe & Northern Railroad hauled 136,000 tons of ore from Mesaba Range mines to its docks at Duluth, this being the greatest day's record in the history of the road. Reckoning by the average trainload of ordinary railroad traffic, the above tonnage would represent a train nearly 50 miles long. As indicating the pressure put upon the ore carrying roads on Lake Superior, it is stated, that the Duluth & Iron Range Railroad hauled more ore to its docks at Two Harbors, Minn., in July than in any preceding month.

Tin Production in 1908.

WASHINGTON, D. C., August 24, 1909.—The action of Congress in providing in the new Payne tariff act for a duty of 4 cents per pound upon tin in all forms—now free of duty—whenever it shall appear to the satisfaction of the President of the United States that the mines of this country are producing 1500 tons of "cassiterite and bar, block and pig tin," per year, has brought to the United States Geological Survey many inquiries regarding the present status of the domestic industry, and lends special interest to the annual report for 1908 which has just been completed by Frank L. Hess of the Survey staff, an abstract of which is presented below.

The only tin ore produced in this country in 1908 was a few tons of stream tin sluiced from gravels in Seward Peninsula, Alaska. The American Tin Mining Company produced a few tons of stream tin from Buck Creek. The ore, which was taken out while assessment work was being done, carried 69 per cent. of tin, and was shipped to Hamburg, Germany, for sale. Buck Creek is in Seward Peninsula, about 20 miles east of Cape Prince of Wales. It is a short creek, only about two miles in length, and has a comparatively small drainage basin. The snow fall of the winter of 1907-08 is said to have been light and the following summer dry, so that water for sluicing was not plentiful.

The Bartels Tin Mining Company, which began prospecting in 1903, continued work on Cape Mountain, near Tin City, five miles southeast of Cape Prince of Wales. The company has a number of shafts and tunnels.

The United States-Alaska Tin Mining Company continued driving a prospect tunnel, which was begun in the winter of 1905-1906, to cut a vein found higher up on Cape Mountain, on which a 35-ft. shaft had been sunk. The tunnel was 421 ft. in at the close of the year. No geologist of the United States Geological Survey has been able to examine the ore in the shaft, owing to water in it. Near the shaft cassiterite is found in large quartz blocks. At other places on the mountain stringers of cassiterite nearly an inch thick have been found in the limestone debris.

Crim, Randt & O'Brien, just before the close of the season, washed a small quantity of stream tin from the gravels along Cassiterite Creek, a branch of Lost River, about 30 miles southeast of Cape Prince of Wales. They did some further prospecting on their tin deposits, but no lode tin was produced. In the course of their prospecting a wolframite deposit was found, which is reported as carrying 30 per cent. of wolframite through 3½ ft.

Prospectors did some work on Brooks Mountain close to the head of Lost River during the summer, but no finds of tin have been reported. Adolph Knopf of the survey discovered on Brooks Mountain two new tin boron minerals in 1907, to which he gave the names of paigeite and hulseite. They are not at present of economic importance. Paigeite was also found on Ears Mountain.

No work is known to have been done in the Carolina field during 1908. The tin bearing area lies on both sides of the North Carolina-South Carolina line, in Cherokee County, S. C., and in Gaston and Lincoln counties, N. C.

At Tinton, in the northern Black Hills, South Dakota, the Tinton Company remodeled its mill and expects to mine tin ore during 1909.

At Hill City, in the south Black Hills, the Gertie Tin Mining & Milling Company was also engaged in remodeling its mill during 1908, with the hope of doing active mining in 1909.

The Black Metal Mining Company holds tungsten (wolframite) claims near Hill City, that carry a considerable percentage of light colored cassiterite in quartz veins. These veins are in places more than a foot in width, and here and there contain handsome intergrowths of cassiterite, wolframite and quartz. A considerable amount of development work was done on these claims during the year. No other operations on tin claims of the region, except annual assessment work, are known to have been carried on.

Neither development work nor production during 1908 has been reported from the tin deposits 12 miles south of Spokane, Wash. At this place cassiterite occurs in pegmatite, and is considered by A. J. Collier, who investigated the occurrence for the United States Geological Survey, to be probably an original mineral. It is accompanied by scheelite and wolframite.

The Florella Mining Company, which has tin deposits in the Franklin Mountains 15 miles north of El Paso, Texas, did some development work during the year, but marketed no ore. Seven veins have been found on its property, and the company reported a considerable amount of ore on the dumps. Placer tin has been found in the gulches near the veins. The deposits are replacement veins in granite and carry some wolframite with the cassiterite.

P. H. Parker, Streeter, Mason County, Texas, reported the discovery in 1908 of cassiterite near that place, both as stream tin and in place, the latter apparently in granite. Streeter is in the western part of the Llano region, an area of crystaline rock forming an island in the younger sedimentary formations of central Texas. White topaz and quartz penetrated by rutile crystals accompany the cassiterite. The occurrence is apparently more of geologic than of commercial interest.

At the time of writing (June, 1909) it is not possible to obtain the figures of production for 1908 of all the tin producing countries, but as shown by exports the following table gives the approximate output for the year:

Supply of Tin in 1907 and 1908.

Total shipments:	1907. Net tons.	1908 Net tons.
Straits Settlements	58,800	67,760
Australia	7,112	6,552
Bolivia	17,136	19,040
South Africa	....	1,904
China	224	....
Banca sales in Holland	12,197	12,880
Billiton sales in Java	2,408	2,464
Production in Cornwall	5,488	6,048
Totals	103,365	116,648

From this table it is evident that in spite of what are in many places considered low prices, there was a large increase in the total production of tin, and that the supply for 1908 was the largest year's supply in the history of tin mining. Australia and China are the only countries that showed a decrease. In the latter case a decrease of exports is not surprising, as it is ordinarily only in years of high prices that tin is drawn into the world's trade from Chinese sources. Little is known of the Chinese tin deposits. W. L. C.

An American Permanent Sample Exhibition at Berlin.—Arrangements have been perfected for opening up a permanent American sample exhibition at Berlin in the spring of 1910. It is designed primarily as an exhibit of distinctively American products, and the management is especially desirous that manufacturers of novelties shall take part. The intention is to make apparent to the people of Europe, and especially Germany and the Continent, the importance and excellence of American manufactures, and to this end the German committee will advertise the exposition throughout the Continent and will co-operate with American manufacturers and exporters in every way to popularize and exploit Ameri- Blank applications for space and all information in regard to the exposition may be obtained by addressing the American Exhibition Company at that address.

Reports that the Carnegie Steel Company will spend a large sum of money for the erection of a plant for the manufacture of car wheels under a new process are denied by the company. About a year ago the company installed a new machine in its Homestead plant which has since been making car wheels under the Slick process, many of which are being used in various lines of service. This department is operating, and the company does not contemplate enlarging its capacity.

The Crocker-Wheeler Company, Ampere, N. J., announces that it will open an office in the Ford Building, Detroit, Mich., on or about September 10. Charles W. Cross will be the manager of this branch.

The Machinery Trade.

NEW YORK, August 25, 1909.

The heavy demand for machine tools in the West is causing considerable comment in the trade in this territory, where no such activity prevails and where, in fact, in some branches of business somewhat of a slump has occurred since the close of July. From reliable reports it appears that machines on which deliveries have been extended several months are chiefly booked for Western plants, and that those for similar work made in the East by companies which do not enjoy such a large Western business can be had on reasonable delivery. Houses in the steam supply line report the same conditions in their business as prevail in the machine tool line. The demand for machinery the past week was not very active and rather irregular, some houses reporting a fair volume of business, while with others sales fell off considerably. Inquiries have also been less numerous and covered only small lots of tools. None of the railroads came into the market for substantial lists of tools, though it is understood that a large list recently issued is about to be closed and some buying has been done by two or three of the more important industrial corporations.

Orders will probably be placed with New York machinery houses within the next few days for a large quantity of machinery to equip the new plant of the Fiat Automobile Company at Poughkeepsie, N. Y. A short time ago the company sent out an extensive list of its requirements, which we understand did not cover all the tools it intends to buy. Bids were submitted by machinery houses on tools which were not included in the list and which it is thought will be required. The company is going ahead with its plans to establish its plant as fast as possible, and it is learned that the machines to be purchased have been practically decided upon and that the formal orders will likely be signed at an early date. The company has moved its headquarters from New York to Poughkeepsie and now all matters pertaining to manufacturing are attended to at the new office.

Plans have been completed and are now in the hands of contractors for bidding for the new automobile plant to be erected at Poughkeepsie, N. Y., for the Fiat Automobile Company. The main building is to be three stories, 120 x 265 ft., with five one-story additions, having a total size of 400 x 700 ft. The total amount of floor space will be over 350,000 sq. ft. Construction of the buildings is to be of steel and concrete, with a rough cast finish to the exterior. The roof is to be an ornamental red tile. The first of the five additions is to contain the painting room, finishing room and shipping room; the second the stockroom, the third the repair room, the fourth the millwright room, the fifth the receiving and inspecting room. The main building will be used as the machine shop and general manufacturing building. No power plant is to be installed, but the building will be equipped with electric power throughout, supplied by the local power company. The buildings are to be equipped with a modern line of motor driven machinery for the various uses in automobile manufacture. Hedman & Schroen, New York, are the architects and W. P. Seaver consulting engineer for the plant. The company expects to start construction by September 10. The approximate cost of the plant is $600,000.

The International Harvester Company has been buying a large amount of machinery in this country for its large plants in course of construction in Lille, France, in the Province of Croyx, near the Belgian border, and at Dusseldorf, Germany. As was stated in these columns some time ago, the company decided to build plants in Europe to escape the heavy tariff imposed upon agricultural machinery. Adjacent to the plants can be obtained all the raw material needed in manufacturing machinery. Orders have been placed so far here for elevator equipment and power machinery, and it is understood that the company will shortly be purchasing some machine tools and forging equipment.

Both iron and wood working machinery will be required by the Flos Shade Roller Company, Ogdensburg, N. Y., to replace that destroyed in the recent fire at its plant. The buildings and equipment were entirely destroyed and the company intends to start rebuilding within the next two weeks, the new plant to consist of a two-story building, 60 x 225 ft.; two dry kilns, each 20 x 100 ft., and a small separate office building. For the equipment of the new structures the company will require self-feed rip, cut-off, swing and universal saws, molders, sanders, rod and dowel machines, boring, chucking and drilling machines, resaws, jointers and other woodworking machinery, and a complete machine shop equipment, including lathes, planer, &c., will probably be purchased. A new shaving exhaust system, heating system, &c., will be needed. The power was furnished by an 18 x 36 in. Allis-Chalmers engine, installed last February, and two boilers of 100 hp. each. The company would like to get in touch with foundries making small malleable and gray iron castings, also makers of stamped sheet metal specialties.

The New York Central & Hudson River Railroad Company has awarded contract and work on construction is to be started at once on a car repair and machine shop, 30 x 450 ft., of brick and steel construction, to be erected at the company's yards at Lyons, N. Y.

The Maryland Portland Cement Company, Baltimore, Md., intends to double the capacity of its plant by the erection of additional buildings and the installation of new machinery. Plans for the enlargement have not been completed and it is not likely that details will be in shape before October 1. The plant is located at Security, Md., and the plans contemplate increasing the output from 800 to 1800 barrels of Portland cement a day.

The city of Toronto, Ont., will receive bids until October 14 for four 13,500,000-gal. pumps, 100 lb. pressure; two 5,000,000-gal. pumps, 300 lb. pressure; two 10,000,000-gal. pumps, 65 lb. pressure; two 10,000,000-gal. pumps, 110 lb. pressure; two 6,500,000-gal. pumps, 90 lb. pressure; two 6,500,000-gal. pumps, 160 lb. pressure; two 2,500,000-gal. pumps, 65 lb. pressure; two 2,500,000-gal. pumps, 110 lb. pressure; valves, piping, bed plate, couplings, &c.; also four 1500-hp. synchronous motors, two 1500-hp. induction motors, four 500-hp. synchronous motors, four 500-hp. induction motors, two 225-hp. synchronous motors, exciters, switchboards, connecting material, &c. For specifications and form of tender application should be made to the City Engineer.

The Atlantic City Electric Company, Atlantic City, N. J., intends to erect a new power plant at an estimated cost of $150,000. Plans have not been completed for the new plant and it will likely be some time before the company is ready to take up the purchase of the required equipment. The construction of the plant will be under the supervision of L. W. Byers, general manager of the company.

Catalogues Wanted.—J. F. Lucey, 1499 East Sixth street, Los Angeles, Cal., jobber of oil well supplies, including boilers and steam pumps, desires catalogues from manufacturers of products sold in connection with a line such as he handles. Branch stores are maintained throughout all the oil fields of California.

Milwaukee Machinery Market.

MILWAUKEE, WIS., August 24, 1909.

Next to the automobile trade, which continues to be the most prolific source of demand, machine tool builders in this State are finding their best customers among manufacturers of both standard and special automatic machinery used in widely varying lines of industry. So urgent have the requirements of these two classes of trade become, and so confident are manufacturers of the necessity for future expansion, that contracts covering tool equipment, as well as power and power transmitting machinery, are now being entered into here for delivery next spring. Builders of milling machines report orders to be filled as late as May and June.

Steam railroads are buying many single tools and the aggregate of this business is considerable, but with the exception of lists already published in *The Iron Age* there have been no opportunities to bid on lots of any size.

Electric traction lines, however, are now providing for the manufacturers of this section some of the most profitable orders ever taken, and there is a large amount of business in sight. Among the immediate needs of both old and new roads are track material, overhead work, bonds, trolley hangers, insulators, lightning arrestors, clamps, couplers, brakes, car motors and controllers, iron poles, steel towers for high tension lines and similar equipment. This is all material which was allowed to run down or was gone without during the period of depression. Power plants and substations were, as a rule, very well maintained, but increased traffic now forces many additions to generating units, converters, transformers, &c., and new lines under construction are already contracting for a large quantity of power machinery. Another demand from the same source is for light machine tools, cranes and hoists, as the more prosperous lines are putting into execution plans for establishing their own repair shops. A particularly notable example of this is the erection, recently begun by the Milwaukee Electric Railway & Light Company, of a plant covering several acres, which will be capable of turning out semisteel cars complete and maintaining the rolling stock of an extensive interurban system.

Kearney & Trecker, West Allis, Wis., who are completing a new power plant, find themselves confronted by the necessity of an extension to their works, according to plans previously prepared. Construction may be commenced this fall. Their normal output has been contracted for a long time ahead.

G. H. Mohr, Green Bay, Wis., has formed a company for the manufacture of brick making machinery and is considering the erection of a plant at Beloit, Wis.

The Apple River Power Company, New Richmond, Wis., is considering the addition of a fifth hydro-electric unit to its present power transmission system.

G. C. Sellers, Merrill, Wis., is having plans prepared for a small electric lighting plant.

Announcement is made that the Allis-Chalmers Company has entered into an entirely new line of industry as manufacturer of sand lime brick plants. Franklin Henshaw, an engineer of wide experience in this field and formerly associated with the International Sand Lime Brick Company, New York, has been employed by the Allis-Chalmers Company as commercial engineer.

The Chicago, St. Paul, Minneapolis & Omaha Railroad has prepared plans for a machine shop and roundhouse at Spooner, Wis.

Announcement has been made by officials of the Soo road that the old Wisconsin Central shops at North Ford Du Lac, Wis., are to be enlarged and modernized. This will necessitate new machinery equipment. A foundry of considerable capacity is to be added in the spring.

The Milwaukee works of the American Bridge Company is erecting for the Oliver Iron Mining Company what is said to be the first steel shaft house ever constructed on the iron range of Wisconsin and Michigan. It is 25 x 35 x 63 ft. and for use in connection with the Doler mine.

The motive power department of the Chicago, Milwaukee & St. Paul Railroad at West Milwaukee is testing an automatic compressed air stoker, which it is claimed will largely increase the efficiency of locomotives.

Geo. H. Miller, Sheboygan, Wis., will put up a two-story building, 100 x 240 ft., to be used for light manufacturing.

Plans for a pumping plant and water distribution system at Albany, Wis., are being worked out by W. G. Kirchhoffer, Madison, Wis.

New England Machinery Market.

BOSTON, MASS., August 24, 1909.

The chief evidence that the vacation season is at its hight is the absence of customers from the stores of the dealers. Business has not let down much in its totals. In fact, an improvement has been noted by some houses, this applying to the supply trade as well as machine tools. But single tool orders are few, which is usually the case at this season, bookings being confined largely to lots of some size. Small orders, a large percentage of which result from personal visits to the stores, are due to return more numerously with the approach of autumn. The general situation in all lines of manufacturing is characterized by an absolute confidence of busy months at hand, every one reporting a substantial basis for this opinion.

An advance in machine tool prices has begun. Those manufacturers who reduced their lists during the depression have returned to their former schedules, and in a few cases prices have been raised above the high level of two years ago by those who declined to follow the trend of the general market when business was dull.

The engine builders are experiencing a complete reversal of the conditions which prevailed only a few months ago. Their works are busy, and prospects of much additional business are very bright, known requirements of customers totaling large figures. This is true of all types, reciprocating and turbine, and producer gas and other combustion engines. The builders of the Corliss type of engines at Providence, R. I., consider the outlook to be one of unusual promise.

The Duckworth Chain Mfg. Company, Springfield, Mass., will build an addition to its factory, 37 x 64 ft., two stories and basement.

The McNab Indicator Company, Bridgeport, Conn., has been incorporated in Connecticut with a capital stock of $10,000, to manufacture a new device known as the McNab marine register and indicator, designed for use on all vessels, large and small, which are propelled by their own power. The incorporators are Norman Leeds and James Coulter, both of the Automatic Machine Company, Bridgeport, and Alexander McNab, New London, Conn. The device will be manufactured in Bridgeport.

The National Spring Bed Company, New Britain, Conn., has acquired land and buildings on the tracks of the New York, New Haven & Hartford Railroad, adjoining its present location, but the company states that no plans have been made for immediate building on the property nor for changing over the existing buildings.

The Gilbert & Bennett Mfg. Company, Georgetown, Conn., manufacturer of wire nettings and cloths, has begun the construction of an additional building, 45 x 301 ft., and four stories, of brick and steel. It will be used as a weave shop. All requirements for equipment have been covered, the company states.

The Rogers Silver Plate Company, Danbury, Conn., will erect a two-story brick building, 40 x 90 ft., to be used for the plating and burnishing departments.

A. J. Raymond, Athol, Mass., manufacturer of window sash and blinds, will build an addition to his mill, 41 x 80 ft., three stories. Mr. Raymond states that additional machinery may be put in later, but he is not yet able to give a list.

The W. H. Davenport Fire Arms Company, Norwich, Conn., manufacturer of shot guns and rifles, has made an assignment to James L. Case, as trustee, for the benefit of the creditors, and the Thames Loan & Trust Company, trustee for the bondholders, has begun foreclosure proceedings. It is officially stated that in all probability a complete liquidation will be necessary, and it is consequently impossible to tell whether the business will be continued.

The crops of New England have suffered severely by protracted drought, which prevailed for weeks throughout the Northeastern States, the recent rains coming too late to help many products. This will doubtless have some effect upon certain lines of business of which the agriculturalists are important customers, including the combustion engine trade and kindred lines, such as pumping equipment.

It is announced that the Worcester County Mechanics' Association will repeat the industrial exposition held in Mechanics' and Washburn halls, Worcester, Mass., last winter. The enterprise was a pronounced success, and it is anticipated that the next show will be on a larger scale, the only obstacle being the limit of capacity of the halls, which were very well filled during the initial exposition.

The Ashland Cotton Company, Jewett City, Conn., will establish a hydraulic power plant at Hopeville, on the Pachaug River, to develop 400 hp., which will be employed in lighting the Hopeville mills and operating electric motors for running machinery. A new dam will be built on an old privilege.

The Plymouth County Gas & Power Company, headed by Patrick J. Nevins, Haverhill, Mass., announces the ambitious project of expending $1,000,000 for the lighting of towns in that section of Massachusetts by the establishment of a gas plant at East Braintree, on the water front, and the laying of over 100 miles of distributing pipe. In the beginning the towns of Braintree, Rockland, Abington, Whitman and Weymouth will be served, and later a number of the coast towns, the total population being estimated at upwards of 65,000.

The Robinson Tool Works, Waterbury, Conn., has brought out a new grinder containing a platen for small surface grinding, a fixture for grinding milling machine cutters, a fixture for grinding twist drills up to 1½ in., and a tool rest for general tool grinding. The company has also put on the market a new universal boring tool holder.

Recent announcements of enlargements of existing general manufacturing plants and new works include the following: Fitchburg Paper Company, Fitchburg, Mass., new mill 300 ft. long to accommodate two machines; French Worsted Company, Woonsocket, R. I., six-story instead of a three-story mill, 112 x 198 ft.; F. M. Hoyt Shoe Company, Manchester, N. H., addition 42 x 120 ft., five stories, and an additional story to a building 42 x 104 ft.; J. Spaulding & Sons Company, Milton, N. H., leather board mill to employ 500 hands, the project including the development of a water privilege for power; Germania Mills, Holyoke, Mass., addition 120 x 220 ft., two stories; New England Cotton Yarn Company, New Bedford, Mass., large addition to house, 70,000 spindles and combing machinery; Lowell Textile Company, Lowell, Mass., new plant at North Chelmsford, Mass.; Manville Company, Manville, R. I., addition 150 x 200 ft.; Rhode Island Soapstone Company, Manville, R. I., new plant on site of present works; Oxford Linen Mills, North Brookfield, Mass., several large buildings in addition to those now under construction, work to begin next spring, one 120 x 700 ft. and another 80 x 600 ft., both four stories; Harvard Knitting Mills, Wakefield, Mass., addition 67 x 139 ft., three stories; Coventry Company, Anthony, R. I., spinning mill, 80 x 350 ft., three stories; Brooks Bank Note Company, Springfield, Mass., additions 42 x 161 ft., one story, and 16 x 50 ft., two stories.

Chicago Machinery Market.

CHICAGO, ILL., August 24, 1909.

The machinery market has been free from spectacular developments the past week, but the same increase in general inquiries that has prevailed for several weeks is more and more manifest. Buyers who have not been in the market for two years are making their appearance from day to day and are more interested in the question of deliveries than that of price. The machinery trade has become, in fact, a new and conspicuous barometer of trade, as it shows in cold figures the willingness of manufacturing and other interests to make investments in new equipment, and it thus reflects a consensus of opinion of all of the active busi-

ness interests of the country. The demand is gradually spreading to the weak spots in the market, and now covers practically every branch of machinery and machine tools.

The Denver Rock Drill & Machinery Company, Denver, Colo., is erecting a three-story warehouse which is expected to be ready for occupancy within 60 days. In addition to the sale of Waugh drills and accessories which the company now handles it is proposed to carry a general line of mining and milling machinery, and with this end in view the company has secured accounts among Eastern manufacturers of high grade machinery. The company is now working its plant overtime, and reports a very satisfactory volume of business.

The Enterprise Machine Shops & Supply House, Jos. Hochenauer, proprietor, Pueblo, Colo., will in the near future build a warehouse and also open up a large storeroom in the business section of the city. The company expects to engage extensively in the machinery supply business, and reports a growing demand for goods in that line.

In order to provide additional floor space for its growing business, the America Heating Company, Rockford, Ill., has leased the ground floor of the Emerson Mfg. Company's building and will immediately remove its office and plant to the new and commodious quarters. The company makes a specialty of vacuum heating and power plant work for factories and business blocks and the installation of steam and hot water systems for residences.

The Griswold Motor & Body Company, manufacturer of automobile bodies, Detroit, Mich., has purchased the plant formerly occupied by the Detroit Folding Cart Company of that city, with the boilers, engines, motors, machinery, etc. The company expects to double the present capacity of the plant, which will require considerable woodworking machinery. The plant is now running at full capacity.

The Hildreth Mfg. Company, Lansing, Mich., making gasoline engines and gray iron castings, is erecting a new machine shop back of its foundry on Porter street.

Having voted bonds on July 26 to the amount of $40,000, the city of Wakeeney, Kan., will on September 1 let a contract for the construction of a water works system to cost $30,000, and on September 8 contract will be let for an electric light plant, the cost of which will be $10,000.

The erection of a steel car plant, electrically operated, as an addition to its present shops, is contemplated by the Mt. Vernon Car Mfg. Company, Mt. Vernon, Ill. Substantial encouragement in the way of promised business from a large railroad system is said to have been given the company.

Cleveland Machinery Market.

CLEVELAND, OHIO, August 24, 1909.

The machine tool market seems to grow more active from week to week, and both merchants and manufacturers are very optimistic over the outlook for the balance of the year. The summer season is now so nearly over that a period of dullness that usually is experienced during the summer is no longer expected. Dealers report a good volume of orders the past week and inquiries are fairly plentiful. The local branch of one large selling agency reports that its August sales so far have reached within a few dollars of its best previous month, with one-fourth of the month still remaining in which to break former records. Nearly all the local builders of machine tools are now running their plants at full capacity and some of the plants have enough orders on hand to keep them busy practically the balance of the year. The market has broadened so that business is coming from all sources, although the large volume of orders is coming from the builders of automobiles and automobile parts. The demand for automatic machines is heavy and among the sales of the week was one lot of 16 automatic machines to a manufacturer whose product is used by the automobile trade. The heavy demand for automobile forgings the past few months will result in the enlargement of a number of forge plants the next few months and the demand for steam hammers has become very active. Among the inquiries that have recently come out is one for 23 steam hammers from a large automobile interest that will install its own drop forging plant. A fair volume of orders for machine tool shop equipment is now coming from the railroads.

The demand for power equipment has improved materially and a good volume of orders and inquiries is coming in for small and medium sized generating units for manufacturing plants. Builders of tanks and boilers in this city and vicinity are now crowded with work, but complaint is made that considerable of this has been taken at unprofitable prices. Engineering firms now have a good amount of work on hand and in prospect.

The labor situation in this city shows no improvement. Good machinists are very scarce and a number of local plants would be running at considerably fuller capacity could the needed workmen be secured. There is also a scarcity of molders.

Finding the capacity of its plant too small to accommodate the growth in its business, the Standard Boiler & Plate Iron Company, Niles, Ohio, will shortly begin the erection of an addition 125 x 160 ft., which will nearly double the capacity of its plant. It is the intention to have the addition completed in 60 days. The company will be in the market for a 15-ton crane, with 60-ft. span. It has a large amount of work on hand, its orders being largely for field oil tanks and refinery work, and its plant is being operated at full capacity night and day.

The Aetna Foundry & Machine Company, Warren, Ohio, is gradually increasing the capacity of its plant. This company recently doubled the capacity of its foundry, and will soon begin the erection of a new pattern shop 40 x 50 ft., three stories. The present pattern shop will be used as a forge shop.

Additions will be made to the Ohio Penitentiary at Columbus, for which proposals will be received by the Board of Managers September 10. Bids will be received for one block of steel cells complete with foundation work, a brick powerhouse, four water tube boilers, a water softening plant and a radial brick chimney. Plans and specifications are on file with the engineers, the Osborn Engineering Company, Cleveland, and the architects, Marriott & Allen, Columbus.

The Cleveland office of the Allis-Chalmers Company has received an order from the Cleveland Worsted Mills Company for a 1500-kw. generating unit, switchboards, &c., for installation in an addition to its power plant at Ravenna, Ohio. This order is practically a duplicate of one received a short time ago from the same company for installation in its Cleveland plant. Among other orders recently received by the local agency of the Allis-Chalmers Company was one from the Atlantic Refining Company, Cleveland, for a 1000-kw. alternator, and two orders for No. 8 stone crushers, one from the France Company, Toledo, Ohio, and the other from the Ohio & Indiana Stone Company, Indianapolis.

The Croxton-Keeton Motor Car Company, Massillon, Ohio, has been incorporated, with a capitalization of $500,000, to take over the plant of the Jewell Motor Car Company. H. A. Croxton, president of the Massillon Iron & Steel Company, is president of the new company.

With a capitalization of $200,000 the Nolox Paper Box Company, Toledo, Ohio, has been incorporated. In addition to making boxes the company intends to equip a plant for the manufacture of box making machines. The incorporators are John N. Van Wormer, C. S. Ordway, R. F. Reynolds, Marion Miller and C. S. Rogers.

A large contract for the metal furniture and fixtures for the new Cuyahoga County Court House, Cleveland, will be let by the County Building Commission, which will receive sealed proposals September 11. Plans and specifications can be secured from the architects, Lehman & Schmitt, Cleveland.

The Borden Company, Warren, Ohio, maker of pipe cutting machinery, die stocks, &c., reports an improvement in business. The company is running its plant at full capacity in all departments.

The D. Connelly Boiler Company, Cleveland, reports a decided improvement in its business. This company now has orders on its books for a large amount of boiler, tank and special structural work.

The city of Canal Dover, Ohio, has asked for bids for electrical equipment for a municipal lighting plant.

Cincinnati Machinery Market.

CINCINNATI, OHIO, August 24, 1909.

While the volume of trade in machinery and machine tool lines in this market has been good, and possibly somewhat in excess of any previous week of the month, it has slumped off in some individual cases. This condition was brought about by the closing of some big sales of lathes, millers and drills principally, which, of course, benefited the firms directly concerned; but in those cases dependent upon sales of single tools and for special installations the record of the week was about the average of the season of midsummer dullness. The large lathe order from the Buick Automobile Company of Flint, Mich., covering nearly 150 machines, which must be delivered by October 1, was secured by a Cincinnati establishment. The tools are to be of the standard patent head pattern, and of the three sizes: 16, 18 and 20 in. swing.

The General Electric Company also bought some tools in this market, which it is understood are to be installed in its Schenectady shops; among these are six large ones, motor driven. Some recent good sized orders for milling machines have come from the West, dealers in Chicago buying some for the stock floor and some for their customers, to be installed immediately. Upright drills continue in popular demand, one large local concern making these a specialty, having orders booked ahead for several months, and

every department strained to the utmost with such skilled help as it is able to secure. A large planer manufacturer reports that August will equal July in its sales department, but as a rule planers have not been as active as the lighter tools. A number of the largest tool manufacturers in this market are running at night and others are getting in readiness to do so.

There is as yet but little demand from Europe.

The automobile manufacturers continue to furnish the major portion of the present business, and from the number of new establishments springing up in this territory, tool makers are assured of an increasing demand for such tools as are used in that industry.

Dealers are stocking up on standard sizes, and all report business increasing.

The jobbing foundries have all increased their melt from 40 to 60 per cent. Some tool makers anticipating a heavy demand for iron are ordering large castings ahead.

The John H. McGowan Company, Cincinnati, is building a large vertical triple expansion pumping engine for the municipality of Temple, Texas. This company has enjoyed a fine summer run of business in its line and reports conditions quite satisfactory.

The Smith & Mills Company, Cincinnati, manufacturer of shapes exclusively, is having a satisfactroy demand for its machines, and is gradually increasing its forces and working time.

The Blymyer Iron Works Company, making sugar cane and sorgo machinery, fruit evaporators and coffee and rice machinery, and shipping extensively into the South American countries, is working a night force.

The King Machine Tool Company, manufacturing boring mills and allied lines, reports conditions quite satisfactory.

The shops making specialties of electrical tools report a great improvement in output the past three months. All these developed and improved their lines of standard tools during the past year or so, and one or two of them have put out an entirely new product, a heavier tool, which has enjoyed a splendid run since it was announced.

Philadelphia Machinery Market.

PHILADELPHIA, PA., August 24, 1909.

From the dealers' standpoint business has been rather quiet. Vacations are to a certain extent interfering with the placing of orders already under consideration, as well as deferring new business. Sales made have generally been confined to single tool propositions, and the aggregate volume of new business was small. Manufacturers' reports are somewhat more favorable. There is a fair volume of business of a general nature coming in, and plants are gradually becoming better engaged, although few except those of the smaller size, making principally special tools, are working at full capacity. Considerable encouragement, however, is taken by both merchants and manufacturers from the fact that the industrial trade continues to move forward steadily. Iron and steel working plants are fast filling up with work, which means that machinery and tool equipment will again be fully employed. The railroads continue to place orders for car equipment and motive power, while increased activity is to be noted in the railroad repair shops in this vicinity. Shipyards here are fairly active and are low bidders for two battleships, the bids for which were opened recently. Automobile manufacturers are very busy, as are those furnishing parts and accessories for that class of work. In fact, every branch of the trade using machine tools shows a betterment, and as the demand continues, and it is now fully expected that it will, requirements in the way of machinery and tools will undoubtedly increase, and a larger volume of business is confidently looked for during the closing months of the year.

Business before the trade still continues of a miscellaneous character, inquiries for the most part covering single tools for extension and replacement, with an occasional demand for a few tools, or minor equipment for small shops. No new propositions covering any extended purchases of equipment have developed recently.

Practically no change is observed in the export demand. Some scattered inquiry is reported, but it is usually for equipment of a special nature, and orders have not been very plentiful. Business for export in power transmission specialties continues fairly active, with slight gains in the volume.

The demand for boilers and engines shows betterment. New propositions for power equipment of a moderate size continue to come out, with occasional inquiries for heavier equipment. Orders are taken more freely and builders are considerably better engaged. Second-hand boilers and engines also show a better movement, particularly in the smaller sizes. The second-hand machinery trade is but moderately active. Business continues of an irregular nature, the demand being rather general, with sales of a minor character.

Orders are coming out in better volume, both for gray iron and steel castings. Jobbing foundries are more actively engaged, a better demand for castings for building purposes being particularly noticeable. Steel casting plants report a better volume of business from locomotive, car and ship builders as well as from heavy machine tool makers. The demand for general machinery castings continues to show a slight improvement.

The American Cork & Seal Company, 1423 Vine street, has had plans prepared for a factory building, 100 x 200 ft., to be built at Frankford Junction. The company proposes to erect a modern plant, fitted with a complete equipment of machinery.

The Philadelphia Rapid Transit Company has begun work on an extension, 78 x 85 ft., to its engine room at Thirty-third and Market streets. It is also proposed to build a concrete, brick and steel pipe shop, 24 x 40 ft., and an oil storage building of reinforced concrete at the same location.

The president of the Board of Sewer Commissioners, Bordentown, N. J., will receive bids until August 27 for the furnishing of all work and materials for a 9-mile sewer system and disposal plant, constructed either together or separately. Plans and specifications may be obtained from the above or from the engineer, 1002 Drexel Building, Philadelphia.

E. E. Brown & Co. will erect on Twenty-first street, north of Packer street, a one and two story foundry, particularly adapted to the manufacture of sash weights. A complete equipment of power equipment and modern foundry appliances will be installed. The building will be of steel frame, brick and iron construction.

Bids for improvements costing approximately $1,000,000 will be asked by the Pennsylvania Railroad, at Greensburg, Pa. A new station will be erected, two additional tracks will be built through that city, a tunnel will be removed and the grade of 1 per cent. will be reduced to one-half of 1 per cent. The contract for the Greensburg work will be the third important one let this year by the Pennsylvania Railroad.

John R. Wiggins & Co. will build a brick power house, 32 x 75 ft., on Kensington avenue, above J street, for the Philadelphia Electric Company.

The Farm Products Mfg. Company, Quakertown, Pa., has let contracts for the erection of a large denatured alcohol distillery plant. The main building will be 45 x 100 ft., four stories, of slow burning mill construction. A 150-hp. boiler, an engine and general equipment for manufacturing purposes are to be purchased.

The L. H. Gilmer Company, Philadelphia, Pa., has again been compelled to move into larger quarters to take care of the increasing demand for Gilmer endless belts. The company's new plant is at 52 North Seventh street, in the heart of the business section of the city, where it has equipped a large and commodious building with the most improved special machinery for turning out its product, much of which was specially designed for the work. With its enlarged facilities the company will be in a position to make quicker deliveries and otherwise take better care of its trade.

Government Purchases.

WASHINGTON, D. C., August 24, 1909.

Bids will be received until September 4 at the office of the Mississippi River Commission, St. Louis, Mo., for one 24-in. centrifugal sand dredging pump, valves, &c.

Bids will be received until September 15 at the office of the United States Engineer, Pittsburgh, Pa., for an air compressor plant for Lock 1, Monongahela River, near Pittsburgh.

The following bids were opened August 17 for machinery for the navy yards:

Class 61.—Four electrically driven centrifugal machines—Bidder 84, Loomis-Manning Filter Company, Philadelphia, Pa., $1800; 91, Manning, Maxwell & Moore, New York, $1518.

The following bids were opened August 18, Circular No. 528A, for machinery for the Isthmian Canal Commission:

Item 1.—Two turbine pumps—Bidder 1, Alberger Pump Company, New York, $2674; 5, Camden Iron Works, Camden, N. J., $4770; 7, De Laval Steam Pump Company, Trenton, N. J., $2640; 8, D'Olier Engineering Company, Philadelphia, Pa., $2776; 9, Fore River Shipbuilding Company, Quincy, Mass., $2430; 12, Jeanesville Iron Works Company, Hazleton, Pa., $2350; 14, Manning, Maxwell & Moore, New York, $3000 and $3556; 16, Vermilye & Power, New York, $3099; 19, Henry R. Worthington, New York, $3670.

Item 3.—Two induction motors—Bidder 7, De Laval Steam Pump Company, Trenton, N. J., $6615; 8, D'Olier Engineering Company, Philadelphia, Pa., $6696; 10, General Electric Company, Schenectady, N. Y., $5568 and $5794; 14, Manning, Maxwell & Moore, New York, $6422; 17, Westinghouse Electric & Mfg. Company, Pittsburgh, Pa., $5995; 19, Henry R. Worthington, New York, $6810 and $5720.

Item 6.—One 5-ton hand traveling crane—Bidder 3, Alfred Box & Co., Philadelphia, Pa., $243 or $325, including item 7, one 5-ton triplex spurred geared block; 6, Curtis Mfg. Company, St. Louis, Mo., including item 7, one 5-ton triplex spurred geared block, $404.60; 8, D'Olier Engineering Company, Philadelphia,

Pa., $240; 11, Hoisting Machinery Company, New York, $290; 13, Knox & Bro., New York, including item 7, one 5-ton triplex spurred geared block, $538.65 and $563.65; 5, Camden Iron Works, Camden, N. J., $198; 15, Reading Crane & Hoist Works, Reading, Pa., $185; 16, Vermilye & Power, New York, $300; 18, Whiting Foundry Equipment Company, Harvey, Ill., $230.

The following bids were opened August 17 for remodeling the boiler plant at the Government Hospital for the Insane, Washington, D. C.:

Item 1, for boilers; 2, pipe and fixtures.

Evans-Almiral Company, New York, item 1, $19,800; 2, $6987.

A. D. Granger Company, New York, item 1, $18,214; 2, $6820.

Edge Moor Iron Company, Edge Moor,, Del., item 1, $19,000; 2, $6240.

Oil City Boiler Works, New York, item 1, $17,350; 2, $7926.

Babcock & Wilcox Company, New York, item 1, $18,575; 2, $5885 welded or $5704 cast iron.

John W. Dantler, Buffalo, N. Y., item 1, $16,925; 2, $6100.

York Engineering Company, York, Pa., item 1, $16,610; 2, $6219.

Heine Safety Boiler Company, St. Louis, Mo., item 1, $15,629.

Walworth Mfg. Company, Boston, Mass., item 2, $5344.

Blake & Williams, New York, item 1, $19,219; 2, $7539.

Osborn & Robinson, Philadelphia, Pa., item 1, $13,800.

E. Keeler Company, Williamsport, Pa., item 1, $14,800.

McKay Engineering Company, Baltimore, Md., item 1, $17,987.

Kahlenberg Bros., Two Rivers, Wis., have been awarded contract for four 6-hp. marine gasoline engines for the Ninth Lighthouse District at $1025.

Under bids opened July 13 for machinery for the navy yards, the General Electric Company, Schenectady, N. Y., has been awarded class 81, one generator set, $11,460.

Under bids opened August 10 for machinery for the navy yards, the Hoisting Machinery Company, New York, has been awarded class 91, one gasoline engine, $2180.

Pig Iron Makers Attack Coke Freight Rates.

WASHINGTON, D. C., August 24, 1909.—The Interstate Commerce Commission is in receipt of a complaint from a number of pig iron manufacturers located at Wellston and Jackson, Ohio, against several railroad companies. The complaint alleges that the rates on coke from the Pocahontas District are unreasonably high, as compared with those in force to Columbus and Ironton, Ohio, and that the defendant carriers have been guilty of violating the Sherman anti-trust act in a concerted movement by which the rates complained of have been advanced and in the acquisition by one of the railroads of a large part of the capital stock of the others. Aside from the question of discrimination involved, the case is of general interest, as it will probably afford a test of the legality of the stock purchases referred to, and of the soundness of the conclusions reached by the Interstate Commerce Commission in its recent report to Congress upon the alleged discrimination of monopolies in coal and oil.

The complainants in this case are the Jackson Iron & Steel Company, Jackson, Ohio, and Star Furnace Company, Wellston Steel & Iron Company and Globe Iron Company, Wellston, Ohio, while the defendant roads include the Norfolk & Western, Baltimore & Ohio Southwestern and Cincinnati, Hamilton & Dayton. The Pennsylvania Railroad Company is also made a defendant to the charge of having illegally acquired the capital stock of the Norfolk & Western, Chesapeake & Ohio and Baltimore & Ohio railroad companies for the purpose of controlling and maintaining rates and suppressing competition.

It is stated by the complainants that the rate in effect on coke from the Pocahontas District to Wellston and Jackson for many years has been identical and on December 31, 1899, was 95 cents per ton. On September 1, 1900, the rate was raised to $1.25 per ton, and on April 20, 1907, was further increased to $1.50 per ton, which is the present current tariff rate. The current rate from the Pocahontas District to Columbus is $1.55 per ton. Applying these rates to the milage from Vivian, W. Va., which is taken as the representative shipping point in the Pocahontas District, the following rates per ton per mile are produced: To Columbus, .0493 cent; to Ironton, .0535 cent; to Wellston and Jackson, .0636 cent.

It is contended by the complainants that the current rates on coke from the Pocahontas District to Ironton and Columbus, in relation to the rates to Wellston and Jackson, give an unreasonable preference and advantage to Ironton and Columbus, and, therefore, to the manufacturers of pig iron located thereat, and subject the manufacturers of Wellston and Jackson to undue and unreasonable prejudice and disadvantage, in violation of the interstate commerce law. It is further alleged that the rate of $1.25 per ton on coke from the Pocahontas District to Wellston and Jackson was not unreasonably high when compared with the rate of 95 cents, which was in effect prior to January 1, 1900, but that the increase to $1.50 was unjust and extortionate.

Referring to the general advances in the rates on coke from the Pocahontas District, the complainants declare that the exaction of the rates "was in direct violation of the Sherman anti-trust act, and was in pursuance and the result of an agreement between the Pennsylvania Railroad Company, the Norfolk & Western Railway Company, the Baltimore & Ohio Railroad Company, the Baltimore & Ohio Southwestern Railroad Company and the Chesapeake & Ohio Railway Company, to make a general advance in the rates on coal, in the carrying out of the policy mentioned in the report of the Interstate Commerce Commission in 'Discriminations of Monopolies in Coal and Oil,' dated Washington, D. C., January 25, 1907, which sets forth in detail the purchase by the Pennsylvania Railroad Company of a large part of the capital stock of the Norfolk & Western Railway Company, Chesapeake & Ohio Railway Company and Baltimore & Ohio Railroad Company, for the purpose of controlling and maintaining rates and suppressing competition."

The complainants submit a schedule showing the shipments of coke made during the past two years to the four furnaces referred to, aggregating 125,317 tons, as to which reparation is demanded on the basis of the difference between the current rate paid of $1.50 per ton and the rate which the commission may decide upon to be the reasonable maximum rate to govern future shipments of coke from the Pocahontas District to Wellston and Jackson. The commission is asked to investigate the complaint and to make an order fixing a reasonable rate and determining the amount of damage suffered by the complainants. Copies of the complaint have been served on the defendant carriers, and they have been given 20 days in which to answer. In default of a voluntary adjustment by the roads, the issue will be joined and a date set for the hearing of the case. W. L. C.

The Youngstown Sheet & Tube Company's New Furnace.—The William B. Pollock Company, Youngstown, Ohio, has been awarded the contract for all the steel work for Furnace C to be erected there by the Youngstown Sheet & Tube Company. The new stack will be a duplicate of furnaces A and B; will be 88 x 22 ft. in size, and will be equipped with four Kennedy center combustion hot blast stoves, each 100 x 22 ft. It will have a daily capacity of 500 tons, and is expected to be ready for operation not later than April 1, 1910. With the completion of this stack the Youngstown Sheet & Tube Company will have a daily capacity for making 1500 tons of pig iron, which will cover the requirements of metal for its Bessemer steel plant. The next large extension to be made will probably be the building of some open hearth furnaces, the erection of these having been under contemplation for some time.

The Newman-Andrew Company, 107 West street, New York, the American branch of John H. Andrew & Co., Ltd., Sheffield, England, has sent out recently a special booklet on its Toledo high speed tool steel, in which valuable data are given concerning the treatment of this steel by tool makers and users, in forging, hardening and tempering. There are special directions for the hardening of high speed milling cutters. A number of useful tables of temperatures, weights and sizes are added.

Announcement is made that the negotiations have been completed for the location at Ashtabula, Ohio, of the new shipbuilding plant of the Great Lakes Engineering Works, Detroit, Mich. The deal has been pending between the city and the company for several months and was contingent upon the donation of about 60 acres of land and an expenditure by the city of about $400,000 in improving the harbor.

HARDWARE

WITH the rapid changes in the tastes and habits of the people it is becoming difficult for the Hardware merchant to keep up with the times and realize profits on new goods without filling up his shelves or his warehouse with mistakes in judgment. In some cities almost every workman has a Bicycle and rides to and from his work, and the Hardware stores carry large stocks and do a very profitable business in this line, while in other towns a merchant has to be cautious in stocking up. In some communities the Washing Machine is popular and one dealer may sell 100 or more in a year, while in other communities, where it is difficult to find any difference in conditions, there is little demand. In some sections many farmers have bought small Gasoline Engines for pumping water and other man-saving jobs, and those who do not own them are coming in rapidly enough to make business profitable for those who supply them. It would be fair to estimate that the Hardware merchant who makes full use of all the opportunities for selling specialties and new lines of goods is making twice as much money as the one who sticks too closely to the old, staple lines.

It is a curious feature of retail trade that the demand for specialties like small Gasoline Engines runs in spots, geographically speaking. In one town there is an active demand, while 25 or 50 miles away there is but little trade. The only explanation that seems to fit the facts is that it depends on the personality of the dealer. Wherever the Hardwareman only handles what people come in and ask for he is likely to find nothing more than a normal volume of business in Nails, Barb Wire and other staple articles; but there is a great deal more business where a sociable dealer with the knack for entertaining and interesting his customers invites the ladies to examine a new Washing Machine or a new line of Baking Utensils, or initiates the farmer into the mysteries of a Gasoline Engine. Every year more and more people in every community are becoming prosperous enough to buy articles that run up into money, and whether they buy depends largely upon the attention shown them and their confidence in the merchant who tries to interest them in new goods.

The Hardware store is constantly making larger and larger demands on the intelligence and ability of the proprietor and his clerks. There was a time when a clerk was considered competent if he could tie up a package of Horseshoe Nails neatly, but modern conditions of trade demand a great deal more than ability to find things on the shelves and tie them up. The modern Hardwareman must understand the mysteries of Coffee Percolators and a thousand and one inventions that now find a place in the home; explain all the fine points in the best tools used in the building trades and all the other trades that men spend years to learn; perhaps give young ladies lessons in pyrography, and tell the farmer how to fix his Binder and put up Lightning Rods. The latest accomplishment which the successful Hardware merchant has found it necessary to add to his repertoire if he would keep up with the times is to operate an Automobile so successfully that it awakens the envy of his neighbors and customers and brings them in to buy the same kind of a car. There is no other business in the wide world that brings a merchant into such intimate contact with the daily life and industries of the people. But if he would reap an adequate reward for his investment of capital he must be alert to take every advantage of conditions as they shape themselves.

Condition of Trade.

The approach of autumn with the expiration of the vacation season finds many absentees again at their tasks and the country's business resuming normal conditions. There are advices of more plants on full time, some overtime, and in certain important staples the makers are swamped with orders, some of which are being taken for 1910 deliveries—a determination in view of advances in raw material sometimes reluctantly arrived at. Orders from road salesmen, who are constantly increasing in number, and mail wants direct from customers, are larger in quantity and value. Stock clerks reporting goods entirely out serve to direct attention to weak spots in other items of size and kind which, while the stock was deemed sufficient before, now necessitates a more liberal treatment in replenishing. Thus a forward movement is developing which, with continued favorable crop harvesting, justifies confidence in a stronger market. Some lines lag and it is improbable that the upward movement will be uniform, but there is abundant reason for a more hopeful feeling and return to improved conditions. Manufacturing plants and large consumers, whose policy for two years has been extreme caution in expenditures, are gradually abandoning that reserve, and specifying new equipment, machinery, tools and supplies and perfecting organizations with greater freedom, while in some instances material is back to the level existing before the important concessions were made in price. With the natural increase in population and consumption there have also been enlargements in producing capacities which the lull since 1907 has enabled manufacturers financially able to carry out better than in times of insistent demands for goods that could not be denied and with deliveries months overdue. There are also even shrewd and observant buyers who, having postponed purchases in anticipation of better opportunities, are forsaking that position and protecting their principals, because of hardening tendencies constantly more apparent. A stronger demand is reported for general Hardware, especially the kinds required for finishing up buildings of all kinds begun earlier in the year.

NOTES ON PRICES.

Wire Nails.—Prospects of a good fall demand are based on large crops and increased building activity. New business received by the mills is comparatively light, but the mills are busy making shipments on orders taken in May. Quotations are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads to jobbers	$1.80
Carload lots to retail merchants	1.85
Less than carloads to jobbers	1.85
Less than carloads to retail merchants	1.95

New York.—A seasonable demand exists for Wire Nails in this market, which is expected to show an increase next month. For small lots at store, Nails are generally held at the base price of $2 per keg, while this price is sometimes shaded 5 cents per keg.

Chicago.—Inquiries from the jobbing trade show con-

tinued improvement, especially from the South and Southwest. The large crops have stimulated building activity, and it is expected that sales through the fall months will aggregate more than the usual volume. We quote as follows: $1.98, Chicago, in carloads to jobbers, and $2.03 in carloads to retailers, with an advance of 5 cents for less than carloads from mills.

Pittsburgh.—Very little new business is being placed in Wire Nails at the $1.80 price, but the mills have pretty well cleaned up shipments on contracts taken at $1.60, and are now actively making shipments on contracts taken at $1.70. The mills will enter contracts for shipment within the next 60 days at the present price of $1.80, but are understood not to be willing to sell for delivery beyond that period. Prices are very firm, and we quote Wire Nails at $1.80, f.o.b. Pittsburgh, in carload and larger lots.

Cut Nails.—Eastern manufacturers made no change in prices at the meeting of the association, held last week. Some manufacturers state that their price will not be less than $1.80 per keg, base, f.o.b. Pittsburgh, but lower delivery prices, to some points, have recently been made. General quotations are on the basis of $1.75, f.o.b. Pittsburgh, this price sometimes being slightly shaded on desirable orders. Iron Cut Nails are held at an advance of 10 cents per keg over Steel Cut Nails in the Western market, but in the East this differential is not observed.

New York.—There is no falling off in the local demand for Cut Nails, requirements being confined to comparatively small lots. The market is not very strong at $2 base, per keg, in small lots at store, as this price is sometimes shaded 5 cents per keg.

Chicago.—The trade is moving along in the usual volume, reflecting to some extent the general increase in building activity and general business. We quote as follows: In carloads, to jobbers, Steel Cut Nails, $1.88; Iron Cut Nails, $2.03.

Pittsburgh.—Prices of Cut Nails have been advanced by the Eastern Cut Nail Association to the basis of $1.75, f.o.b. Pittsburgh, and we are advised that this price is now being generally observed, concessions being smaller and harder to obtain than for some time. Iron Cut Nails are held at an advance of 10 cents per keg over Steel Cut Nails in the Western market.

Barb Wire.—A seasonable amount of new business is being received by the mills. The market is firm and quotations are as follows, f.o.b. Pittsburgh:

	Painted.	Gal.
Jobbers, carload lots	$1.80	$2.10
Retailers, carload lots	1.85	2.15
Retailers, less than carload lots	1.95	2.25

Chicago.—The volume of new business is very satisfactory, and the trade seems to have readjusted itself to the recent advance in price. There is every indication of a good demand for fall trade. We quote as follows: To jobbers, Chicago, carloads, Painted, $1.98; Galvanized, $2.28. To retailers, carloads, Painted, $2.08; Galvanized, $2.38; retailers, less than carloads, Painted, $2.13; Galvanized, $2.43. Staples, Bright, in carloads, $1.98; Galvanized, $2.28; carloads, to retailers, 10 cents extra, with an additional 5 cents for less than carloads.

Pittsburgh.—This is the dull season of the year in this trade, and very little new business is being placed. Some contracts are still on the books of the mills to be filled taken before the last advance in prices, but very little new business is being placed. We quote Galvanized Barb Wire at $2.10 and Painted at $1.80, in carload and larger lots, f.o.b. Pittsburgh, subject to usual terms.

Fence Wire.—Shipments from mill include a moderate amount of new business and the filling of orders taken in May. Quotations per 100 lb. to jobbers in carload lots are as follows, on a basis of $1.60 for Plain and $1.90 for Galvanized, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash is 10 days, the usual price to retailers being 5 cents additional :

Nos.	0 to 9	10	11	12&12½	13	14	15	16
Annealed	$1.60	1.65	1.70	1.75	1.85	1.95	2.05	2.15
Galvanized	1.90	1.95	2.00	2.05	2.15	2.25	2.65	2.75

Chicago.—Specifications and new orders for Fence Wire continue in a very satisfactory volume. In Plain Wire used by manufacturing interests inquiries are especially good, and these departments of the mills are running at full capacity. The market is firm at the following quotations: Carloads, to jobbers, $1.78, base, f.o.b. Chicago.

Pittsburgh.—The mills are busy making shipments on old contracts, and but little new business is being placed at present prices, most consumers having covered their requirements for 60 days ahead or longer before the last advance was made. We quote Plain Wire at $1.60 and Galvanized at $1.90 in carload and larger lots, f.o.b. Pittsburgh, subject to usual terms.

Rope.—The market reflects a stronger tone and demand shows slight improvement. While there is no radical change in conditions indications point to a more regular and increasing trade. The following quotations represent the market for moderate quantities: Pure Manila of the highest grade, 8¼ to 8½ cents per pound; lower grades of Pure Manila, ¼ to ½ cent less than the foregoing quotations. Pure Sisal of the highest grade, 7½ to 7¾ cents per pound, base; Commercial grade, 6½ cents per pound. Rove Jute Rope, ¼ in. and up, No. 1, is quoted at 5 to 5½ cents per pound.

Nuts.—Nuts are now quoted at higher figures, as indicated by the following discounts from list, viz.: Plain Cold Punched Nuts, Hexagon, 5 9-10 cents off; Square Nuts, 5 3-10 cents off; Hot Pressed Nuts, Hexagon, 6 2-10 cents off; Square Nuts, 5 7-10 cents off the list. Semi-finished Nuts take a discount of 80 and 10 and 5 per cent.

Window Glass.—The settlement of the question of wages for the blast of 1909-1910 has created a firmer feeling in Window Glass circles, and improved trade conditions are expected. Some plants have started up and others are making preparations to do so in the near future. It is thought that by the end of September the majority of the factories will be making Glass. A meeting of the Western Window Glass Jobbers' Association was scheduled for August 24, at which it was expected that trade conditions would be discussed and that the question of prices would be given attention. Prices recommended by the Eastern Window Glass Jobbers' Association, from jobbers' list, October 1, 1903, for territory east of the Alleghany Mountains are as follows: New England States, from jobbers, Single, 90 and 35 per cent., and Double, 90 and 40 per cent.; New York State, Single, 90 and 35 per cent., and Double, 90 and 40 per cent.; New York State, factory shipments, Single, 90 and 45 per cent.; Double, 90 and 50 per cent.; some portions of Pennsylvania are accorded discounts 5 per cent. better than other States; in the Southern States discounts vary from 90 and 25 to 90 and 40 per cent. on Single and from 90 and 30 to 90 and 45 per cent. on Double, from jobbers.

Linseed Oil.—On August 23 card prices of City Raw were reduced 4 cents per gallon, to 57 cents for 5 bbl. or more, the readjusted market being nearer to actual conditions than have existed for some time. Values are apt to show fluctuations until demand becomes larger. Out of town Raw is obtainable at about 53 cents and up for quantities of 5 bbl. and more. New demand is very light, and low prices seem to be no inducement for buyers to stock up, and they are supplying nearby requirements by ordering moderate lots. Large buyers are ordering shipments on contract orders, some of which expire early in October, about the time the new seed crop matures.

Spirits Turpentine.—The market has shown steady advances during the week on Southern reports of light receipts and good domestic and foreign buying. The higher prices have retarded buying at this point to some extent. The New York market is represented by the following quotations: Oil Barrels, 58 to 58½ cents; Machine Made Barrels, 58½ to 59 cents per gallon.

THE WORCESTER RAG WAREHOUSE COMPANY is packing large clean cotton renovated wiping and polishing rags for use by manufacturers of machinery, engines, boilers, cars, pianos, organs and furniture, and for electrical works, &c. These include white knit, plain white, colored knit, old hair and lace curtain cloths.

Reducing Fire Insurance Rates.

How a Saving of 40 Per Cent. Was Secured by a New Jersey Merchant.

MORE than a year ago fire broke out at an early hour in the morning in the store of John S. Menagh, Jersey City, N. J., and practically destroyed a large stock of Hardware. The fire was supposed to have originated among barrels of oil in the cellar of the building.

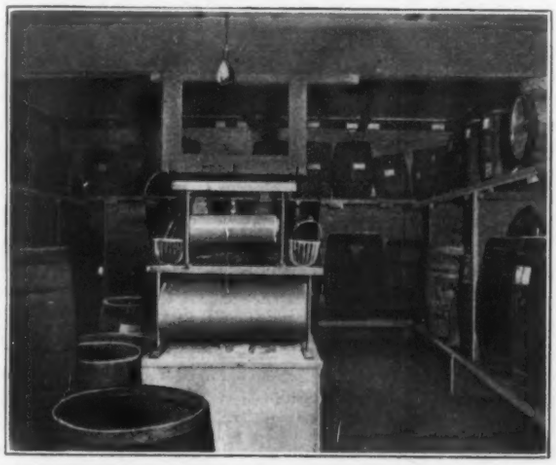


Fig. 1.—Cellar Oil Room, Surrounded by a 12-In. Brick Wall, with 6-In. Ceiling of Steel Beams and Concrete and Concrete Floor, Separated from Main Cellar by Sliding Automatic Fireproof Door.

In erecting the new store, the main part of which is 25 x 100 ft., four stories and cellar, precautions have been taken by which Oils, Paints, &c., are separated from the balance of the stock so as to prevent a recurrence of fire from similar causes, and greatly reducing the insurance premium on the entire stock. At one side of the main building, about 60 ft. from the front, are two rooms, one above the other, the interiors of which are shown in Figs. 1 and 2. The room, Fig. 1, has its floor on a level with the floor of the cellar and the floor of the one above is on a level with the floor of the salesroom. In these two rooms Oils, Paints and kindred goods are kept.

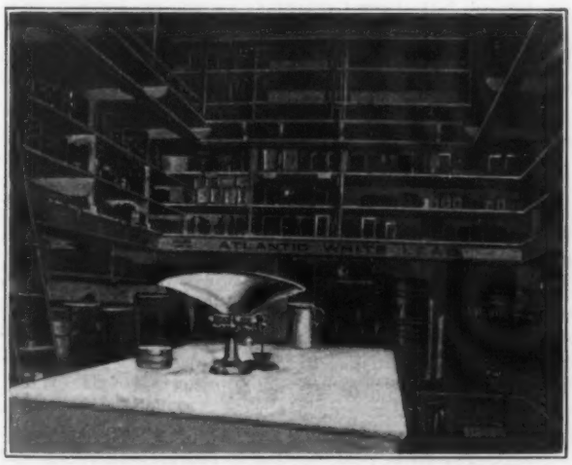


Fig. 2.—Main Floor Paint Room, Surrounded by a 12-In. Brick Wall with Concrete Floor and Roof, Separated from Salesroom by Sliding Automatic Fireproof Door.

The inside dimensions of the rooms are 16 x 24 ft., and a brick wall 12 in. thick laid in cement incloses them. The ceilings of the rooms are steel beams laid in concrete, and the floors are of concrete. Above the ceiling of the upper room is also a slag roof. The cellar room has a hight of 10 ft. and the upper room a hight of 14 ft. Each room is divided from the main store by a sliding door covered with tin on both sides and equipped with automatic fire door fixtures. When the doors are shut there is no ventilation, and in case of fire the flames would be confined to the room of origin. The rooms are lighted by electricity controlled by switches outside. The fire protection thus secured was considered so complete by the insurance companies that the rate on the contents of the Paint and Oil rooms if separately insured would have been $1 per $1000 less than on the general Hardware stock, while the rate charged on the entire stock and building was 40 per cent. lower than it would have been without this protection. Thus the hazard of having barrels or tanks of Oil, Varnish, Turpentine, &c., in close proximity to other goods was minimized.

The sliding fireproof door to the cellar room is 4 x 6½ ft. in size. As shown in Fig. 1 planks are used upon which to stand barrels and kegs. The planks are 4 in. thick and 14 in. wide, and the distance between the lower and upper shelves is 4 ft. The untidy materials are kept in this room, also waste and powder. Store sweepings are put here overnight and removed the following morning. On the lower shelf is Ready Roofing Liquid, Coal Tar, Carbolic Acid, Astral, Signal, Cylinder and Engine Oils, Creosote, Rock Salt, Salammoniac and Alum. On the upper shalf are kept in kegs goods for which there is a limited sale, including odd sizes of Nails, Dowel Pins, Galvanized Staples, 10-in. Wire Spikes, Axle Grease, Boat Spikes, &c. A strip of wood nailed to the shelf between each keg keeps them in place, and the contents of each keg is marked on a card immediately above it. The room on the main floor level, Fig. 2, has a sliding door 4 x 8 ft., and a concrete platform 14 in. high and 24 in. wide, extending around three sides of the room, for tanks and barrels. Above the tanks and barrels is a gallery, reached by the steps shown at the left. The shelving above is hung by steel rods from the steel beams, and on the shelving is kept surplus stock. The tanks and barrels on the platform contain Linseed Oil, Turpentine, Varnishes, Denatured Alcohol, Dryers, Hard Oil Finishes, Machine Oils, &c.

THE BERING-CORTES HARDWARE COMPANY, Houston, Texas, has increased its capital stock from $100,000 to $250,000. This step was taken principally on account of the company's rapidly increasing business, which in a wholesale way extends over the entire State of Texas, while the retail trade has also materially enlarged. Another reason was to afford some of the company's employees who have been with the concern for a long time an opportunity to subscribe for a portion of the stock issued. This business is said to be the oldest in Houston, dating back to the time when Martin Schmidt conducted a Hardware store at the corner of Congress and Travis streets, which business was purchased by J. C. Bering and the late H. W. Cortes in 1885 and continued as a partnership under the style of Bering & Cortes until 1894. In the latter year J. H. Schumacher purchased an interest, and in 1901 the business was incorporated under the style of the Bering-Cortes Company, with an authorized capital stock of $100,000, all of which was taken by the members of the old firm. At a recent meeting of the directors the following officers were elected: J. C. Bering, president; J. H. Schumacher, vice-president; W. A. Cortes, treasurer, and G. W. Rulfs, secretary. No stock has been offered for sale to the public, and the affairs of the company will be conducted along the same lines as in the past.

A NEW COMPANY under the same style has been incorporated under the laws of the State of New York to take over and continue the business of the Roebuck Weather Strip & Wire Screen Company, Brooklyn, which includes the manufacture of custom Screens, Weather Strips, Ventilators, &c. The new officers are as follows: Charles F. Fairbanks, Jr., Clinton, Mass., president; G. A. Warren, Clinton, Mass, treasurer, and Walter H. Dodd, New York City, secretary.

AMONG THE HARDWARE TRADE.

William Theuner Hardware Company, St. Louis, Mo., organized with a capital stock of $2000, has established a store at 3817 Easton avenue, to carry on a General Hardware, Stove, Tinware and Housefurnishings business.

The Hardware business formerly conducted by J. J. Karst, Stillwater, Minn., has been taken over by Parkhurst & Mosier, the transfer being made by the trustee in charge. The stock includes Stoves, Ranges, Cutlery, Tinware, &c.

Hawley, King & Co. have been reincorporated, with a capital stock of $100,000, in Los Angeles, Cal., the original incorporation for 20 years having lapsed. The firm does a wholesale and retail business in Agricultural Implements and Vehicles.

The Johnson Hardware & Furniture Company, Fluvanna, Scurry County, Tex., has been incorporated with a capital stock of $12,000, all paid up. The incorporators of the company are G. H. Johnson, T. J. Herron and L. B. Herron.

The Voight Bros. Hardware Company has succeeded to the business of Houstonia Hardware Company, Houstonia, Mo., handling Shelf and Heavy Hardware, Stoves, Tinware, Housefurnishings, Agricultural Implements, Sporting Goods, Vehicles, Fencing and Harness. A new two-story building is being erected as an addition to the premises already occupied.

Fire destroyed the building of the Crandon Hardware Company, Crandon, Wis., handling Shelf and Heavy Hardware, Stoves, Tinware, Housefurnishings, Window Glass, Agricultural Implements, Paints, Oils, Sporting Goods and Building Material.

The Webb-Adams Hardware Company has been incorporated in Brookneal, Va., with a capital stock of $25,000, to conduct a wholesale and retail business. The company occupies a new building 90 x 100 ft. in size, with 17,000 sq. ft. of floor space.

The Fralick-Geddes Company has been incorporated in Grand Island, Neb., with a capital stock of $10,000, handling Housefurnishings, Furniture and Sporting Goods.

A. H. Speer has purchased an interest in the W. H. Lewis Hardware Company, Atchison, Kan., handling Shelf Hardware, Stoves, Tinware, Agricultural Implements, Sporting Goods.

Shadley & Goss have engaged in the Implement business in Mapleton, Kan.

E. L. Ellington's stock of Hardware, Stoves, Paints, Oils, &c., at Donaldson, Minn., has been damaged by fire.

Smith & Brown have purchased the business of A. G. Serr in Tyndall, S. D., and will handle Shelf and Heavy Hardware, Stoves, Tinware, Window Glass, Sporting and Plumbing Supplies.

The J. Neuman Hardware Company, Lafayette, Ind., has been incorporated with $10,000 capital stock by Julius Neuman, A. A. Memmer, Ernst Kalberer, J. J. Burkhart and George Buerkle.

GEORGE E. TYSON, superintendent of the Penn Hardware Company, Reading, Pa., has been elected a member of the Board of Directors of the company, to fill the vacancy caused by the death of the late Albert A. Heizmann.

THE SPEER HARDWARE COMPANY, Fort Smith, Ark., has let a contract for a new six-story building with basement, 100 x 140 ft., to be constructed of pressed brick with white stone trimmings.

CONTENTS.

	Page.
Suspension Railways in German Iron Works. Illustrated.	609
Manufacturing by a Municipality. Illustrated	611
German Iron Workers' Wages	611
The Liggett Spring & Mfg. Company	611
The Aeromobile, a Novel Heavier-Than-Air Machine. Illus.	612
The Dodge Relief Association	613
Virginia the Oldest Coal Producer	613
A New Gear-Testing Machine. Illustrated	613
The Residual Brown Iron Ores of Cuba. Illustrated	614
The Gardner Under-Belted Disk Grinder Drive. Illustrated	617
The Van Doren Lubricator	617
The Rate of Combustion in Blast Furnaces	618
Ferracute Can-Soldering Machines. Illustrated	620
Coke Production in Pennsylvania in 1908	621
Concrete Shafts at Lake Iron Mines. Illustrated	622
The Bristol Quick-Reading Electric Pyrometer. Illustrated	625
Oiling Systems	625
A New Colburn 30-In. Vertical Boring Mill. Illustrated	626
Customs Decisions	627
The Ferroalloy Duties	627
A New Lead Pipe Plant at Pittsburgh	627
Improving Heat Transmission in Air Heaters. Illustrated.	628
Firth Steel	629
Ferrotungsten Powder	629
The Bilz Sand Mixer and Sifting Machine. Illustrated	630
The Maymont Self-Oiling Loose Pulley. Illustrated	630
The Cincinnati Two-Speed Planer Drive. Illustrated	631
The New Model Star Lathe. Illustrated	632
Battleship and Armor Bids	633
Editorial:	
The Lake Ore Movement in 1909	634
The Steel Industry and Concrete Reinforcement	634
The Maximum Tariff Clause	635
Boiler Explosions Seldom Caused by Bad Steel Plates.	636
Correspondence	636
Personal	637
Obituary	637
The Republic Iron & Steel Company	638
The Lake Superior Mining Institute	639
The Algoma Steel Company Sells its Mesaba Mine	639
Drawback Rulings on Shipments to the Philippines	639
News of the Works:	
Iron and Steel	640
General Machinery	640
Foundries	640
Power Plant Equipment	641
Fires	641
Hardware	641
Miscellaneous	641
Car and Locomotive Orders	641
The Iron and Metal Trades:	
A Comparison of Prices	642
Prices of Finished Iron and Steel, f.o.b. Pittsburgh	642
Chicago	643
Cleveland	644
Pittsburgh	645
Philadelphia	647
Cincinnati	648
St. Louis	648
Buffalo	649
Birmingham	649
Metal Market	650
The National Roll & Foundry Company Now Running	650
Iron and Industrial Stocks	650
New York	651
Judicial Decisions of Interest to Manufacturers	651
The Industrial Attraction of Niagara Power	652
The Mexican Iron & Steel Company	652
New Publication	652
Heavy Iron Ore Shipments from Minnesota	652
Tin Production in 1908	653
An American Permanent Sample Exhibition at Berlin	653
The Machinery Trade:	
New York Machinery Market	654
Milwaukee Machinery Market	654
New England Machinery Market	655
Chicago Machinery Market	655
Cleveland Machinery Market	656
Cincinnati Machinery Market	656
Philadelphia Machinery Market	657
Government Purchases	657
Pig Iron Makers Attack Coke Freight Rates	658
The Youngstown Sheet & Tube Company's New Furnace	658
Hardware:	
Condition of Trade	659
Notes on Prices	659
Reducing Fire Insurance Rates. Illustrated	661
Among the Hardware Trade	662
The Question Box	663
Advertising in the Air	664
Merchants Exchanging Trade Journals	664
Labor Day Window Advertising	664
Recessed Diamond Window Display. Illustrated	665
A Hardware Store with a History. Illustrated	666
Price-Lists, Circulars, &c	667
Requests for Catalogues, &c	667
Making Good in Business	668
Humphryes Mfg. Company's Trademark. Illustrated.	668
Cui Bono?	669
Markt & Co.'s Larger Field	670
Death of Thomas J. Leary	670
Stanley Rule & Level Company's New Catalogue	670
The Eben Hardware Mfg. Company	670
The Eli Self-Feed Three-Stroke Hay Press No. 6	670
The Unique Lawn Mower Grinder. Illustrated	670
Chicago Triplex Spring Butts. Illustrated	671
The Sensation Safety Razor. Illustrated	671
The I-X-L Fireless Cooker No. 1. Illustrated	671
The Farm Pump Engine. Illustrated	672
The Mascot Electric Welded Baseball Mask. Illus.	672
Arcade Cast Iron and Steel Toys. Illustrated	673
Current Hardware Prices	674

This department is open for the discussion of questions which arise in the practical conduct of the Hardware business. Our readers are invited to contribute, submitting inquiries or answering questions.

Correspondents are expected to give their names and addresses, but in order to encourage frank expressions of opinion the advice of our correspondents will be treated in confidence, names and addresses not being published.

For convenience, Questions or Answers should be addressed to THE IRON AGE QUESTION BOX, 14-16 PARK PLACE, NEW YORK.

Automobiles and Accessories.

The Extent to Which Hardware Merchants May Advantageously Handle This Line.

For the season of 1910 it is expected that American manufacturers will turn out in the neighborhood of 200,000 Automobiles, this estimate being based on figures compiled from reports made by makers of Axles, Magnetos, Frames and other parts. Of the 200,000 cars thus planned for, it is figured that 165,000 will be pleasure cars, the remainder of the output consisting of High Wheel Buggies, Steam and Electric Carriages and Commercial Vehicles. The total business in pleasure cars alone will probably amount, approximately, to $200,000,000.

These are imposing figures, and yet the manufacturers are not apprehensive that there will be an overproduction in this line owing to the fact that the country's greatest purchasing element, the middle class, is now entering the field together with the farmers, who have been liberal buyers during 1909, especially in some of the Western States, one manufacturer reporting that three-fourths of his output of cars of moderate price were sold to farmers.

Part the Hardwareman Should Play.

In view of this great increase in Automobile production, the question has been brought up by one of our correspondents as to the part the Hardware merchant should play in the marketing of this line. Some enterprising Hardwaremen are already doing something in this direction, and are in a position to furnish the varied supplies and accessories. A few, indeed, are handling the machines themselves. In both instances a satisfactory business has been the result.

It is evident, however, that while the supplies may be conveniently taken care of the sale of the Automobiles themselves is a problem that calls for the exercise of special care and attention on the part of merchants. Some merchants are inclined to doubt the feasibility of taking up a line of the machines, and are fearful that the time and special thought required to conduct their sale successfully would imperil their interests in regular Hardware lines. They are disposed to regard the sale of Automobiles as a separate and distinct business. On the other hand, a few merchants see no reason why the experience of the trade with Bicycles should not be duplicated.

Jobbers' Views of the Question.

Some idea of the feeling of the trade, wholesale and retail, in regard to the matter will be gained from a perusal of the letters given below. One of the largest jobbing houses in the country expresses the following view:

It is the opinion of our people from our experience so far that automobile accessories will in the future be handled largely by Hardware merchants, as was and is the case with bicycle sundries. There are a number of staple items, such as Spark Plugs, Tire Repair Outfits, moderate priced Lamps, Pumps, Jacks, Horns, Goggles, Soaps and Lubricants, that can now be handled by conservative dealers with safety.

The automobile and accessories business is still in a somewhat formative condition, but we are of the opinion that it will eventually settle down into regular lines, as did the bicycle business.

Another well-known jobber makes the following comment, in which a contrary view is expressed:

We have not undertaken this at all. We regard it as rather out of our line. There might be some portion of the country where it would fit in, but so far hereabouts the automobile agents and their extensive garages have constituted a separate business.

Expressions from the Retail Trade.

The letter given below is from an enterprising retail house in the South, handling Hardware and Machinery, which has erected a garage and has met with much success in this line:

Keeping Pace with the Times.

FROM MARYLAND: We endeavor to look ahead and as developments occur and new commodities are placed on the market we try to discriminate between the good and the bad, and the good that is relative to our line of business we promptly take on. We find we would have many unprofitable days in our business did we not keep apace of the times. We consider Bicycles and Automobiles and their accessories a part of the legitimate Hardware business. They are relative and each is a feeder to the other. We have been in the Automobile and Bicycle business, in addition to our general Hardware and Machinery, business for several years, and have found it very profitable and easily managed in connection with our regular force. Of course, it takes considerable space to carry a line of Automobiles, and we would suggest by all means to have a garage a little distance from the Hardware store, as gasoline will be used in and about the garage, which, if you have near your place of business, would affect insurance on the general Hardware stock. We keep a man for general purposes around the garage all the time. Our garage is connected with a telephone line, and he can communicate with the main store any time when a customer comes in, so that we may send a man familiar with the Automobile business over to talk machines to the prospective customer. Of course, in a small town it will not pay to have a high priced Automobile man to attend to nothing but the garage, as the business will not warrant it; but to run Automobiles in connection with general Hardware this way we consider profitable and entirely feasible.

Garage Located Some Distance from Store.

An Illinois merchant believes that before long the accessories at least will be very desirable to handle:

FROM ILLINOIS: I have had no experience selling Automobiles, but believe that the Hardware trade will be working into them more each year. I think it will be necessary to have a repair shop to take care of ordinary repairs. I believe the accessories will before long be a very desirable line for Hardwaremen to handle.

A well-known merchant in Iowa expresses himself as follows, taking the position that while the time may come when the line may be a profitable addition to the Hardware business, the way is hardly clear at present to take hold:

Requires Too Much Time and Attention.

FROM IOWA: I do not believe it would be advisable for the average retail Hardware merchant to undertake to handle Automobiles, as he is now pretty generally overburdened with details. My observation is that the Automobile business requires a good deal of time and attention. To a good many merchants it would become an attractive part of their business, and I believe would receive a great deal of attention at the expense of some other very important features. I am inclined to think that the business is at present on a rather fictitious basis, and that it is not nearly as profitable as it appears to be on the surface. In time cars will become very much cheaper and consequently more staple. The time may come when it can be made a profitable addition to the retail Hardware business, but my judgment is that at the present time the wise merchant will let them alone, unless occasionally under

special circumstances he may find it to his advantage to add this line.

We shall value further expressions from the trade as to their experience in this field and the wisdom or unwisdom of attempting the sale of automobiles and related supplies.

Advertising in the Air.

THERE are many special advertising plans being brought out which the Hardware merchant can use to advantage, and at very small expense, if he will only keep himself on the alert to get them while they are new, or comparatively so, thus attracting attention and causing comment in his locality.

Kite Banners.

Huge banners attached to kites and floating on the breeze high in the air over the store, where they can be seen for miles around, are not in themselves so much of an innovation, but a variation of this idea has been used with great success in New York City by the E. I. Horsman Company, which is putting complete outfits of this sort on the market. Crowds on both upper and lower Broadway have been "rubbernecking" at dummy trapeze performers suspended from the cords of these kites, immediately under the advertising banners. The dummy is life size in each instance, and in the wind it swings and kicks in a very lifelike manner. It is a certain eye catcher and attracts thousands of readers to the lettered banner above, besides causing comment which frequently brings the name of the advertiser into mention.

Simple Construction.

The construction of the outfit is simple, the banner and dummy being suspended by two box kites. In simpler forms, without the heavy dummy, banners can be flown with the aid of one kite of this type. In either case it is advisable to place a windlass kite reel on the roof of the building for handling the long cord necessary.

Use at County Fairs.

Such a display should be valuable to merchants who exhibit at county fairs, as it will not only mark the location of their exhibit, but can also be seen at great distances outside the grounds.

SPENCER C. CARY, head of the Cary Mfg. Company, 19-21 Roosevelt street, New York, has returned from a European trip begun June 14. The journey included France, Switzerland, Germany, Belgium and England, and while the outing was a combination of pleasure and business, Mr. Cary took some excellent orders for the Steel Mat brought out within the past year. The company manufactures sheet metal specialties in box strapping and kindred lines which are marketed in Europe by the company's representative, William P. Notcutt, 8 White street, Moorfields, London, E. C. A contract has lately been received from the United States Government to furnish the type of Steel Mat referred to for installation in public buildings throughout the country, including post offices, custom houses, court buildings and other Government structures, at a price we are advised higher than competing mats.

THE BOSTON BELTING COMPANY, Boston, Mass., has succeeded in making what is said to be the longest continuous length of Rubber Hose for garden use, Air Tools, &c., ever produced. It measures 1170 ft., and heretofore the lengths have usually been 500 ft. or less. It is claimed that the longer lengths are more advantageous for merchants to carry in stock to be cut to suit each customer, instead of depending on the regular 50-ft. lengths. The company issues a folder describing the Forsyth Braided Hose, which is a seamless tube of high grade rubber, circular braided of seamless fabric, made of hard twisted yarn, double threaded throughout, and impregnated and thoroughly coated with rubber. Two layers of this fabric are used and a final cover of high grade tough rubber is added, which insures long wear and durability.

Merchants Exchanging Trade Journals.

BY CLARFIELD.

It is almost needless to impress upon a merchant the value of reading the publications of his own trade, but how many have ever thought of studying those of other trades as well?

Good suggestions often appear in the dry goods, shoe or novelty trade publications, which never get into Hardware publications, because they are not in themselves directly applicable to the business. Still, by some variation which the merchant himself can make to suit his requirements, they may be worked out to the advantage of the business.

A Plan Worth Trying

is that of exchanging trade literature with business acquaintances in different lines of business. Where is the well posted business man of to-day who should not be interested in the iron and steel developments as specialized by *The Iron Age*, and that quite irrespective of his particular line?

Trade secrets are not handled so openly that they need to be feared, and if discounts are published they can be cut out of the magazine before the exchange is made.

Good ideas mean bigger business and greater aggregate profits. They are worth digging for.

Labor Day Window Advertising.

BY F. B. M.

LABOR DAY is a holiday. Holidays are spent either in recreation or as a diversion in work of some kind around the home. Therefore, let the Hardware merchant place the following placard in his window:

WARNING!
PREPARE FOR
LABOR DAY
at least the SATURDAY BEFORE
as this STORE will be
CLOSED on LABOR DAY.

Have "the man with the Hoe" standing in one corner; another sawing wood or putting Chair Seats in an old chair, a man perched on a Ladder with Paint Brush in hand, and still another holding a Fishing Pole or some other item from the Sporting Goods stock. Cut the figures out of heavy cardboard and color with crayon. Where there are two windows it will pay to duplicate the figures which appear hard at work in the first window, by having them all in the second window, with Hoe, Saw, &c., thrown over the shoulder, as if marching in a parade.

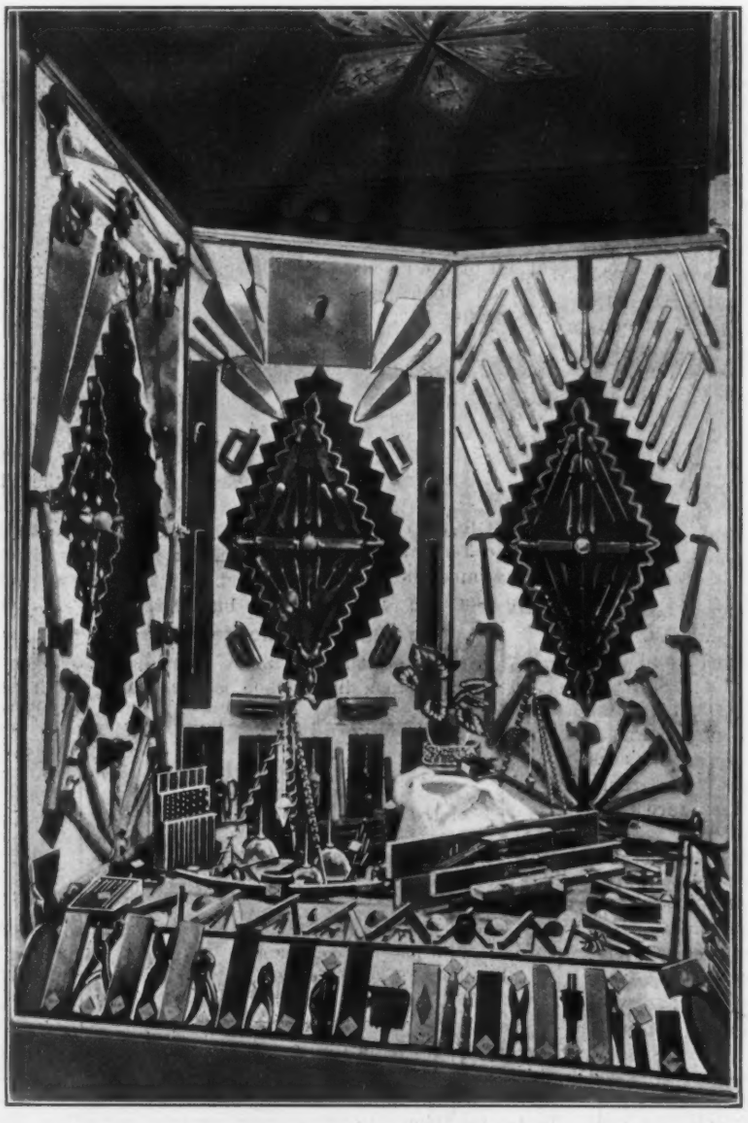
CHARLES BROWN & SONS, San Francisco, Cal., recently celebrated the fifty-second anniversary of the establishment of their business by taking possession of new quarters at 871-873 Market street. The new store is an especially attractive, convenient and well appointed establishment. An exceptionally complete line of Hardware, Housefurnishings, Sporting Goods, Stoves, Crockery, Glassware, Silverware, Cutlery, &c., is carried.

A FREE permanent exhibition of high grade Building Materials and Appliances, indorsed by architects in Greater New York, is being conducted by the Building Trades Employers' Association in the Builders' Exchange, 30-34 West Thirty-third street, New York. James J. Conor is manager of the exhibition department. The public is admitted free, there being a small charge for space occupied.

Recessed Diamond Window Display.

WHAT can be done in the way of an effective display of tools in a very small show window is shown in the accompanying illustration of one of the windows in the store of the Spiro Hardware Company, 1920 Third avenue, Birmingham, Ala.

First the back walls and ceiling were covered with black cotton flannel. The recessed diamonds were formed of boards covered with red material, with white silk cord around the edges, which were a series of points. These boards were hung from the ceiling by Brass Chain,



Window Display of Spiro Hardware Company in Which the Recessed Diamond Feature Is Prominent.

and each had an Electric Lamp in the center. The three larger display boards were of equal sizes, covered with white material, with red silk cord around the outer edges.

In the boards were cut diamond shaped openings to conform in size and contour to the smaller boards, and all the boards were trimmed before placing in the window. The larger boards were set about 4 in. in front of the smaller boards, thus producing the recessed diamond effect. On the floor of the window there was a raised platform with the sides next to the glass slanted back, permitting goods to be placed against them. On the ceiling was a centerpiece of diamond-shaped boards, displaying Pocket Cutlery.

The center board of the three was devoted largely to the display of Masons' Tools, and those on either side, as well as the floor, displayed a variety of Mechanics' Tools.

The tools on the boards were not crowded, and each was put on with narrow tin strips, nailed with Brass Head Tacks. The price tags, in plain figures, had the effect of holding people before the window for a longer time than if no prices were given.

THE HARRY MEAD COMPANY, operating a number of stores in Oklahoma, with headquarters at Shawnee, has bought the business of the Wichita Hardware Company, Wichita, Kan., handling at wholesale and retail Shelf and Heavy Hardware, Stoves, House Furnishings, Window Glass, Paints, Sporting Goods, &c. The new management will enlarge the store and materially increase the stock.

LEE & UNDERHILL, 98 Chambers street, New York, as sole United States agency for the Starr Mfg. Company, Ltd., Dartmouth, N. S., are distributing to the trade copies of the new Starr Skate Book, forty-fourth edition, in the 32 pages of which are illustrated and described the various styles of Ice Skates, Hockey Sticks, &c., made by the company. The Starr line of Skates includes the Acme Club, Velox, Regal, Mic-Mac, Starr and double ended bracketed Hockey Skates, the Acadia, Beaver, Starr Skeleton and Starr Figure and Scotia and Boys' Hockey Skates. Two styles new for this season are the Graceful Beauty and Speedaway Skates. The G. B. Skate is purely for fancy movements, waltzing and expert rink use, made of best material, finely ground, polished all over and nickeled. The Speedaway is for outdoor long distance, straightaway skating, with clamps, and made only to order after furnishing outline of boot soles to insure accuracy. The company also manufactures the Mic-Mac and Rex Hockey Sticks. Lee & Underhill are carrying a stock of such numbers of Skates as have been found to be the best sellers in the United States. On the larger import orders direct shipments are made.

THE AMERICAN OIL & SUPPLY COMPANY, 52-56 Lafayette street, Newark, N. J., has issued catalogue No. 1, relating to fine tools, machinery and supplies and specialties for jewelers, silversmiths, dentists, opticians, engravers and metal workers. The goods are arranged in alphabetical order throughout under their commonly known names. While with this arrangement reference to index will not often be necessary, one is supplied in the closing pages of the book. A quick and accurate method for writing orders for the goods shown is recommended by the company as follows: "When ordering please be sure to give the page number, also the number or size of the article." Thus an order for one-half dozen plain eye drop forged 12-oz. riveting Hammers would be written: "One-half dozen No. 33, 311." This indicates the quantity wanted, the item number and the page of book on which the item appears. The catalogue contains over 600 pages, is printed on a fine quality of paper and profusely illustrated. At the top of each page is a designation of the goods shown.

A. H. Kleberg has engaged in business in Caroline, Wis., carrying Hardware, Stoves, Tinware, Glass, Agricultural Implements, Paints and Oils.

A Hardware Store With a History.

THE interesting bill, a portion of which is reproduced in Fig. 1, is part of an order sold by the Hardware firm of Homer Foot & Co., Springfield, Mass., in the year 1848. The original bill from which the illustration was made is interesting, not only for its age, but also for its suggestiveness regarding the nature of the Hardware business of former days. At the time the bill was written, practically no Hardware was made in this country, everything being imported, as suggested by the fact that the items on the bill are priced in pounds, shillings and pence. It is also interesting to compare the prices at which tools were sold at that time with those which are current at the present day.

Suggestions of Former Days

Homer Foot & Co. are known throughout New England as pioneers in the Hardware business, and one of the oldest existing houses in that territory. The business was originally owned by James Scutt Dwight, an old country merchant of Springfield, who had six branch stores up and down the Connecticut River, and was one of the important traders in that section. He kept everything, including rum, molasses, groceries, &c., and also ran a brewery. Stock was sent out from headquarters to the different branch stores by loaded wagons, which made their rounds every week. In 1831 Homer Foot bought out Mr. Dwight, and from that time the business was confined more and more to Hardware, Iron and Steel, and allied products. Mr. Foot became one of the most prominent and substantial citizens of Springfield, and for years before his death, in 1898, his name was one to conjure with in local financial and civil affairs. He had numerous business interests and was influentially connected with several corporations, including the Massachusetts Mutual Life Insurance Company, of which he was a director.

A Pioneer Hardware House

A Prominent Citizen

There were many interesting features in the methods of doing business in the early days. As already stated, nearly all goods handled were imported, the first domestic made Hardware being offered to Mr. Foot by Philip Corbin, who relates an interesting anecdote of his first efforts to find purchasers for his products in Springfield. Goods were sold on four and six months' time, settlement being made by notes. Nearly all shipments were made by river freight and transportation bills were adjusted only once a year.

Customs of Early Days

The business has been moved only twice, being established in 1834 at the corner of State and Main streets, and in 1847 removed to the opposite corner, where it remained a landmark until within a couple of years. Then it was moved to a new and attractive store, with modern fixtures, &c., on State street, perhaps two or three blocks from its original location. Homer Foot had 10 children, three girls and seven boys. Of the latter several became identified with the Hardware business. F. D. Foot is now at the head of the firm of Homer Foot & Co., being president and treasurer of the corporation. J. D. Foot, who was well known as a member of the File making concern of Kearney & Foot Company, was originally connected with the Springfield concern, but this was finally crowded out by his other interests. S. D. Foot was also actively interested in the File business.

An Old Landmark

Well Known Names

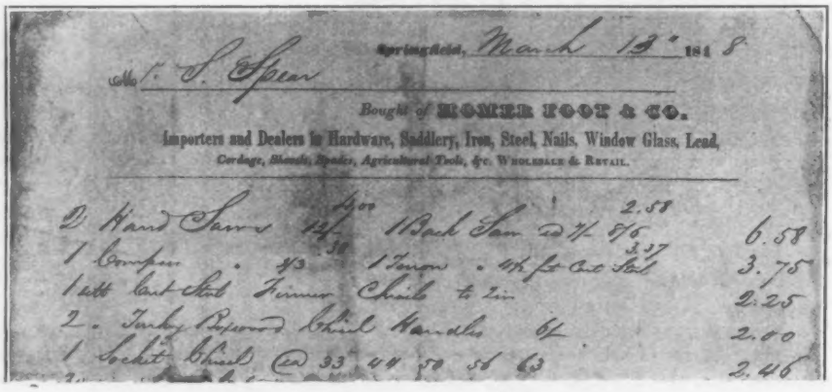

Springfield, March 13th 184 8
Mr. T. S. Spear
Bought of HOMER FOOT & CO.
Importers and Dealers in Hardware, Saddlery, Iron, Steel, Nails, Window Glass, Lead,
Cordage, Shovels, Spades, Agricultural Tools, &c. WHOLESALE & RETAIL.
2 Hand Saws 14/ 1 Back Saw 7/6 2.58
1 Compass 43 1 Trowel 4/6 3.77
1 Lett Cast Steel Turner Chisel 1 in 6.58
2 Turky Rosewood Chisel Handles 6d 3.75
1 Socket Chisel @ 33 40 50 56 63 2.25
2.00
2.46

Fig. 1.—Bill of Homer Foot & Co., Dated March 13, 1848.

Features of the New Store.

As already stated, this historic business has recently been removed to a handsome modern store, which contains many features of interest to Hardware merchants who are looking for new and improved methods and ideas. Some of these features are illustrated in the photographs reproduced herewith. Fig. 2 gives an excellent idea of the attractive glass floor cases and wall cases. It also shows a specially constructed wood top case, built to fit the space is occupies, and designed to serve as a wrapping counter. The case has sliding glass doors in front, and will, of course, display to advantage numerous attractive lines. As illustrated, it contains a handsome assortment of Thermometers. A corresponding arrangement of showcases, wall cases, &c., is found on the opposite side of the store.

Wrapping Counter

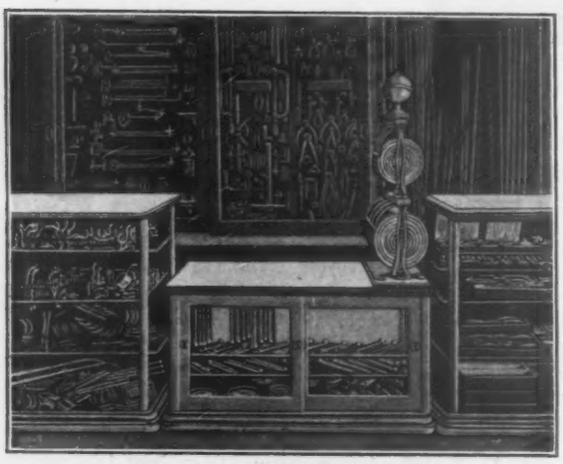


Fig. 2.—Wrapping Counter and Floor Cases in Store of Homer Foot & Co.

Fig. 3.—Fishing Rod Stand.

In Fig. 3 is illustrated an original device for accommodating Fishing Rods; also an elaborate and well dis-

played stock of Dog Collars in the wall case behind. The Fishing Rod stand consists of an oval base containing sockets for the butts of the Rods, with another oval frame about 4 ft. above it, which acts as a guide in holding the Rods upright. This frame is cut into divisions corresponding with the sockets below, and when the Rods are put in

Fishing Rod Stand

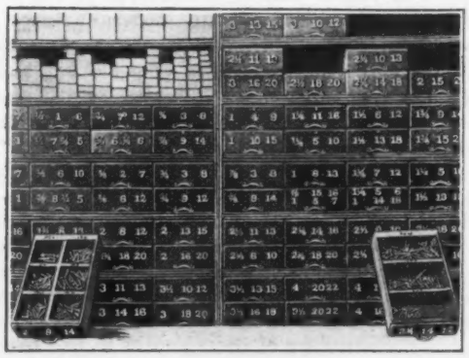


Fig. 4.—Section of Shelving Containing Open Stock of Wood Screws.

place they are retained by small brass hinges, which close down over the openings at the outer edge. The advantages of this rack are obvious in permitting Rods to be quickly and conveniently shown at full length.

The shelving of the store is fitted with oak front metal shelf boxes throughout, especially designed to accommodate the different lines of goods which they contain. A fair idea of the shelving may be gained from Fig. 4, which shows the section containing the open stock of wood screws. The sizes of screws contained in the compartment shelf boxes or drawers are indicated by the metal figures on the fronts, which are bright and present an exceedingly rich and effective appearance. Sizes are also marked on the edges of the different compartments, into which the drawers are divided.

Modern Shelving

Price-Lists, Circulars, Etc.

Manufacturers in Hardware and related lines are requested to send us copies of new catalogues, price-lists, &c., for our Catalogue Department and for notice in this column.

SUCRO FILTER COMPANY, 42 Broadway, New York: Catalogue illustrating Gravity Filtration Water Coolers, filtration systems for private residences; also combined with wind mill and water tower for country estates, factories, &c. The system is also adapted to office buildings, hotels, municipalities, and for filtering other liquids besides water.

NORMAL NOVELTY WORKS, Normal, Ill.: Circulars illustrating the Climax Lawn Weeder, Edwards' Adjustable Nut Crack, Crigler's Adjustable Shade Bracket, Combined Fruit Colander and Berry Sieve, and Automatic Sash Lock.

STRONG-BATTELLE MFG. COMPANY, Bellaire, Ohio: Catalogue illustrating a line of Hazel Wood Enameled Ware, which is three-coated, white lined, with the Rookwood pottery effects reproduced on the exterior surfaces. Enameled covers are supplied with all covered articles.

NEW YORK LEATHER BELTING COMPANY, 51 Beekman street, New York: Booklet entitled "From Forest to Factory," illustrating exact conditions under which the Victor-Balata Belting has been successfully operated.

AMERICAN STEEL & WIRE COMPANY, Chicago, Ill.: Price-list of Nonspinning Hoisting Rope; also booklet containing tables of electrical wires and cables.

ABBOTT BALL COMPANY, Hartford, Conn.: Circular describing the treatment of small metal goods by the burnishing and tumbling process, involving the use of steel balls in tumbling barrels.

GOOD PAINT COMPANY, 225 Dearborn Street, Chicago, Ill.: Booklet devoted to Carbonall Paint, which includes Metal Preservative, Waterproofing Compound, Flat Black Paint and Blackboard Slating.

Requests for Catalogues, Etc.

The trade is given an opportunity in this column to request from manufacturers catalogues, price-lists, quotations, &c.

REQUESTS for catalogues, price-lists, quotations, &c., have been received from the following houses, with whom manufacturers may desire to communicate:

FROM BOYD-SWEENEY COMPANY, which has been incorporated in Roanoke, Va., handling Shelf Hardware and Sporting Goods. Mr. Boyd was formerly president of the Roanoke Hardware Company.

FROM CHAS. E. HECOX, who has engaged in business in Ontonagon, Mich., handling Shelf Hardware, Stoves, Tinware, Housefurnishings, Window Glass, Agricultural Implements, Paints, Oils and Sporting Goods. Plumbing and tin work is also done.

FROM IRWIN & Co., Almira, Wash., who have increased their capital stock to $25,000, carrying a stock of Agricultural Implements and doing plumbing and heating work. The firm is occupying a new brick building.

FROM THE BATH HARDWARE COMPANY, which has been incorporated in Bath, Maine, with a capital stock of $10,000, and just commenced business. The lines handled include Shelf and Heavy Hardware, Window Glass, Agricultural Implements, Paints, Oils and Marine Hardware.

FROM HOTEL & HOSPITAL SUPPLY COMPANY, Atlanta, Ga., which has been incorporated with a capital stock of $25,000. The company handles an extensive line of supplies for hotels, butchers, hospitals, sanitariums, colleges, dairies, &c.

FROM S. P. HINES & SONS, who have purchased the business of Hope Bros., Warrensburg, Mo., carrying Shelf and Heavy Hardware, Stoves, Tinware, House Furnishings and Sporting Goods.

FROM M. O. MADSON & Co., who have purchased a stock at Wylie, Minn., and will have it shipped to Mentor, Minn., where they will carry on the Shelf Hardware, Stove, Tinware, Housefurnishing, Window Glass, Agricultural Implement, Paint and Sporting Goods business.

THE firm of Lyon & Grumman, Bridgeport, Conn., has been succeeded by the Lyon-Grumman-Manson Company, which has been incorporated with Leo C. Lyon as president; Elmer E. Grumman, secretary and treasurer, and John A. Manson, vice-president. Lyon & Grumman established themselves in the Hardware and mill supply business 24 years ago, and have developed into one of the largest and best known concerns in this line in New England. John A. Manson is a Hardwareman of experience and ability, was formerly a member of the firm of John A. Manson & Co., Burlington, Vt., and is well and favorably known to the trade.

As an illustration of the improvement in general business conditions as well as a substantial indication of the enterprising manner in which the company is pushing its business, it is interesting to note that the Norvell-Shapleigh Hardware Company, St. Louis, Mo., reports that from January 1 to August 17 of the present year its sales have increased over the same period of 1908 to the extent of $1,000,000.

THE CAMPBELL IRON COMPANY, St. Louis, Mo., is now located at its new address, 809 to 819 Cass avenue, where a full line of Iron, Blacksmiths', Wagon Makers' and Horse Shoers' Supplies and Tools is carried.

To know
That which before us lies in daily life
Is the prime wisdom. —*Milton.*

Masterfulness.

Are you a master of your actions, or are you being mastered continually by the will of others, by circumstances and your environment? The great majority of men can be divided into these two classes. To say a man is masterful is to pay him a compliment. A horse or a domestic animal easily can detect the tone, the touch and the spirit of a masterful mind. Such men get the quickest obedience from animals and humans. The term "master" here does not refer to an employer. Many owners of businesses come into them by inheritance and are not masters of others or themselves, either by instinct or training. Hundreds of employees, on the other hand, some day doubtless will be employing others. You can see it by studying their faces, their actions, the quiet, determined, resolute manner of the one who is sure that one day he will be in business for himself and make a success of it.

Master and Mastered.

Generally the great army of the mastered trust much to such things as luck, chance, fate and the future. They do not get into the habit of relying on themselves, because they have found out from past experience their judgment has been worthless. Want of self-reliance and confidence chiefly marks the "mastered man." If a man wants to get out of the class of the mastered, the subjected, the dependent, he wants to stop and stop immediately relying on strokes of good luck. He wants to avoid thinking about things as they might be and turn his whole attention to conquering the world as it is now. The way the world has treated him in the past is a first-class indication as to how it will treat him in the future. Only to get better treatment he must aim to alter himself and not the world.

Self-Reliance and Confidence.

Good Manners.

Good manners often do more for a man than money or influence. They open many a portal to the aspiring which otherwise would remain closed, and lead the way to recognition and success. The man of polish, of suave and courtly bearing has a much better chance of getting along in the world than the man of a rough, overbearing disposition who endeavors to attain his ends by brute force, regardless of the feelings or rights of others. Oil runs smoother than water every time and penetrates recesses where the other cannot enter, and, moreover, keeps everything bright and shining and in good working order, while the water is liable to rust and corrode and wear out the machinery. The human wheels must be greased with the lubricant of good manners in order to wear well and avoid friction. They will be easier turned and consequently able to cover more ground than if allowed to become clogged with biliousness and ill humor, with grouching and growling and general disagreeableness. Sunshine irradiates both light and life around, while darkness casts gloom everywhere and is inimical to the vitality of being. Be sunny, be cheery, have a pleasant word and a friendly greeting for all with whom you come in contact; be open, just, generous, affable in your business transactions and everyday life and you cannot fail of success. You will be surprised to find how much agreeable manners contribute to success, and what a sesame they can give you into all ranks and all places. The courteous, well mannered man can go anywhere. The boor is repulsed from every door. Coarseness, vulgarity and ugly dispositions lock the gates of friendly feeling, put up the bars before the warm heart of welcome, draw down the blinds on the windows of love, and make all within cold and sinister and forbidding, whereas courtesy, cheerfulness and good breeding hold a passport to homes and hearts, gain an entree into every shrine and sanctuary of human feeling, and receive a cordial invitation to return. Good manners go farther than letters of recommendation. The well mannered man usually gets first place. A position is always open to him who has a pleasing way; he can make himself twice as valuable as the gruff man, and attract while the other repels. Nobody likes to patronize ill mannered people. They are shunned as much as possible by those who wish to walk on a smooth path and enjoy the amenities of life. Few of us like to walk in the shade of the cypresses when a flower spangled path is just beside which, instead of leading to the tomb of failure, stretches onward in the sunlight to the goal of success. Always keep polished. Rust eats away and destroys. Don't let ice water get into your veins; keep the good, cheerful, warm blood coursing through them. A smiling countenance and kind words will do more for you than a fat pocketbook and the "pull" of your friends. Good manners have brought men to the front while both money and "pull" have left them behind.—*Madison C. Peters.*

Promoting Success.

Sidestepping the Gruff Man.

Initiative.

That man is strong who does the tasks
Made his by place and circumstance,
Who falters not nor questions asks,
Nor leaves results to time or chance—
Who turns from finished things to new
And does the work he's told to do.

Yet stronger is this other man,
(However well may serve the one),
Who meets a problem with a plan,
And does the thing that must be done—
With firmer grasp and wider view,
Does that he sets himself to do.—*System.*

Humphryes Mfg. Company's Trademark.

WITH the coming of August the Humphryes Mfg. Company, Mansfield, Ohio, began putting upon every Pump and Cylinder of its manufacture a label bearing trademark reproduced herewith, and in the future no piece will leave the factory without being thus labeled. The trademark is an attractive one, being in four colors, red, yellow, black and white, and giving a distinct outline of the Statue of Liberty. In adopting this trademark the company is desirous of impressing upon the trade the high quality of its product, and it is expected that its appearance on the company's goods will prove attractive to the merchant and customer and aid in increasing the already extensive business done by the company.

THE SIMONDS MFG. COMPANY, Fitchburg, Mass., and 40 Murray street, New York, has just issued an attractive hanger for gratuitous distribution. It is a lithographed picture with metal backing, 13½ x 20 in., entitled "The Woodsman." There is a reproduction of a wood chopper with axe on shoulder against a picture of a circular rip saw in the background.

Cui Bono?

The Social and Business Sides of Conventions —Proper Channels of Trade—Jobbers', Retailers' and Catalogue House Special Brands and the Remedy—Syndicate Buying—A Plea for Full Organization.

AN ADDRESS BEFORE THE MICHIGAN RETAIL HARDWARE ASSOCIATION BY W. P. BOGARDUS, MT. VERNON, OHIO.

As I stand here and realize that every part of the State of Michigan is here represented, and that business men who can hardly spare the time are here from all over the State, intent on getting out of the meetings all that they can from a social, as well as from a business, standpoint, I am impressed that there is a call for these meetings, and that you gentlemen are answering a call that is so insistent that you are willing to spend your money and give your time to come. What will you gain by coming? The answer to that question has many phases, and it depends on the point of view what the answer shall be.

The Social Side

of the question opens up to us the possibility of a large acquaintance covering the entire State. And that acquaintance brings to each one of us many of the experiences of those we meet, and as we interchange these experiences we often find solutions for many of the problems that we have heretofore been unable to solve. If we bring our wives with us, as we should, we give the better part of us a pleasure that not only enriches but brings pleasant memories to us for many a day. The entertainment that we get at these meetings comes but once a year, and to have our wives with us, to see and have a part in the pleasures, adds additional satisfaction to all of us, and helps to make our enjoyment the keener.

The Business Side

of the question we can answer by pointing to the results that have been accomplished in the past 14 years. We commenced the organization with the hope that we could find some remedy for the injury that was being done to our trade by catalogue house methods. At that time every jobber that could was furnishing these houses all they would buy, but as they grew in size and volume of business they left the jobber and went to the manufacturer, who, too, was glad to sell them, for many of their orders were in excess of the orders that very many of the jobbers were able to give.

Both Jobber and Manufacturer Have Seen the Error

of their methods and, I think, are trying to bring trade back to the proper channels again. But we all know that bad habits are hard to overcome, especially when it means a loss of trade for the time being. The immediate present appeals so strongly to us and the present dollar looks so much larger than the dollar of to-morrow or next week that it will only be by some severe effort that we shall be able to get back into the old channels. The immediate inducement and the force that will cause both the jobber and manufacturer to sit up and think is the organization of 27 different associations of hardware men, covering 33 States.

One of the Results of Organization.

That these organizations are more than simply gatherings of men bent on pleasure is evidenced from the discussions that take place, and the papers that are read, that discuss conditions and suggest remedies for some of the troubles that encompass us. And one of the important results that has come from these discussions is the fact that but few of the reliable standard brands of goods are now listed and quoted in the catalogues of the catalogue houses, and that restricted prices are, in many cases, insisted on before catalogue houses can get goods that are at all desirable.

Catalogue House Special Brands.

One of the results of this care on the part of the manufacturers in keeping their brands of goods out of the hands of the catalogue houses is that "special brands" are being pushed by them, brands of goods that no one knows anything about, but which are lauded as superior to any other goods, and guaranteed as perfect in all respects. The guarantee has but little value, for when a house will guarantee a paint to last 10 years and that will not blister, peal or rub off—a paint that on analysis shows the presence of 25 per cent. water—the hight of absurdity in guaranteeing has certainly been reached.

Now if such a foolish guarantee is made on one line of goods is there any reason to believe that other guarantees made by such a house would be any saner? And the question comes to us, Is such a system legitimate and such competition just or honorable? We have, to a certain degree, shorn the catalogue house of the terror it once inspired. And their competition we do not fear, provided the manufacturer will help us by giving us, through the jobber, an equal chance to get the trade of the consumer.

Syndicate Buying.

We find the sale of goods to be a very difficult proposition when the manufacturer regulates his prices on the quantity he sells a firm, without regard to any other consideration. There is much being said against syndicate buying, especially by retailers. And it is held that it is very bad business for retailers to indulge in. I note the interest the jobber has for the welfare of the retailer, and in his desire to keep the retailer in the straight and narrow way, but I wonder if syndicate buying is not just as good for the retailer as for the jobber, if quantity is the only requisite for getting low prices.

I am in hope that the time will come when the manufacturer will realize that the sale made to-day will have an influence on the sale made to-morrow, next week or next year. The building up of our trade is never finished. Each day's work bears some relation to the work of the store in making it a success or failure. So it is with the manufacturer. The work of the day is not finished when he closes his office, but whatever has been done has its effect on the future. And if it is not done right the work of the day will come back to plague him. The great objection, to me, in syndicate buying is that you lose your identity, to a large extent, when you let another, who has no special interest in your welfare, buy your goods.

The Individuality of a Store Is Its Good Will

and has a value as an asset in business. Some firms have resorted to special brands to secure for their stores an individuality. But special brands as usually indulged in do not add much to the name of a store, but rather injure it, for if goods are bought in the open market and price is the main consideration, then the mere pasting of a label on the goods has but little value, especially when it is known that the parties using the label do not manufacture the goods.

The label to have a value should tell the truth. If it said "Made for and guaranteed by" it would advertise more effectively than to say "Made by Blank" when it was known that Blank did not manufacture at all. Because of a misstatement in regard to the making of the goods, have we a right to conclude that there is a possibility that the firm will not hesitate to make others? And if such a possibility exists, is not the basis of our confidence lost in that firm?

Jobbers' Special Brands vs. Manufacturers' Brands.

I was in a large factory the other day and as I passed along I noticed a number of boxes marked with the names of a number of jobbers. In talking with some of the men I inquired what was the difference between the goods put up for the several jobbers and the goods with the brand of the factory on them. There was some hesitancy in answering the question, and to relieve the evident embarrassment I said "No answer is necessary; I have all I want." It is claimed that we can get more for special brands than we can get for standard brands. But when it is known, as it is, by both retailer and consumer that special brands have no superiority over the standard brands the effort to get a larger price for the special brands fails, and there comes to the mind of the consumer a suspicion that the special brands are got up to make the consumer pay more for the goods than they are really worth, and so the consumer loses confidence in the merchant he is dealing with.

While competition has a good deal to do with the making of prices, yet there are but few, and they are short lived, who are willing to sell goods without a profit. The prices a merchant gets depend on the confidence the community where he lives has in him as a man, in his integrity, honesty and truthfulness, and his ability as a salesman. The same rule applies to the jobber. The fact that a merchant is selling manufacturers' brands does not imply that he is selling any "old thing," but it does imply that he is selling the best that that manufacturer can make.

The Relief from Special Brands Must Come

from more individuality in the manufacturer and less of combinations and trusts. The control of any line of goods by one or two great consolidations is not good for that line of goods. The claim that such consolidations make for greater economy in the manufacturing of the goods may be true, but experience shows that the consumer does not participate in these economies, and when he realizes that the combination does lessen costs and that he is getting no benefit his mind is embittered and he is ready to influence legislation that is aimed at the combination, but which in very many instances rebounds against the consumer.

The manufacturer that is selling his goods to any and all that come and permitting the quantity to regulate the price, and who has no further interest in his goods, as to where they go or to whom they are sold, or of the prices being made on them, is standing in his own light, and will in the near future have troubles of his own. For to sell

to men who are known price cutters, and whose great aim is to undersell their competitors, is but to sow dragons' teeth that will grow into troubles galore.

Complete Organization Necessary.

There is a thing that we should all rejoice over and that is the tendency to organize, that we may get into closer touch with one another. Manufacturers, jobbers and retailers in their organized capacity have more consideration for one another and are learning to measure and respect the strength of the various branches of the trade. I look forward to the time when there will be discussions on the floor of national conventions by representatives of all three branches of the trade as never before. And I believe that this interchange of ideas will accomplish much for the betterment of the trade generally. To arrive at such a condition involves a more complete organization among retail dealers. There are some things we will have to face in the near future, and to face them successfully means more complete organization. I was impressed by a remark made to us while in Washington by a very prominent statesman in relation to parcel post. He said: "The fight is on. You need all the strength you can get. To succeed you must perfect your organizations."

Markt & Co.'s Larger Field.

MARKT & CO., 193-195 West street, New York, purchased the name, good will, trademarks and unfilled orders in hand of the New York Export & Import Company, 133 Front street, New York, at a meeting of creditors recently held. They will combine the business of the New York Export & Import Company with their own business in the Far East. V. A. Dodge, former president of the company, his brother Henry T. Dodge, who has been one of its Eastern managers and has spent seven years in the East, have joined Markt & Co.'s Asiatic department, as has Henry T. Seymour, who was the former vice-president and connected with the old company for the past nine years. For the present the business will be conducted under the name of Markt & Co., but in the near future it is the intention to form a new company to devote its entire attention to the Far Eastern and Australian trade. The business of the New York Export & Import Company was largely in Hardware, Tools and Machinery, similar in character to that of Markt & Co. With manufacturers having special selling and agency arrangements with the former company, it is the desire of Markt & Co. to continue them uninterruptedly, and the Messrs. Dodge have been cabled to continue sending in orders as in the past. As to the merchants in the Far East who have dealt with the old company, Markt & Co. will endeavor to serve their interests with fidelity and greater efficiency, possessing as they do all the old records, correspondence and necessary data.

Death of Thomas J. Leary.

THOMAS J. LEARY, well known in the Gun and Hardware trade throughout the country, died suddenly on the 23d inst., from heart failure, being stricken on his way home. Mr. Leary had not been in good health for two years, but had apparently improved in physical condition. Mr. Leary was born in New York forty-nine years ago, and spent a large part of his business life with Alfred Field & Co., identifying himself later with the house of Wiebusch & Hilger. January 1, 1898, he went into business for himself as importer, manufacturers' agent and wholesale dealer in Fire Arms and Materials, at 89 Chambers street, continuing until January last, when he sold out to C. H. Biermann, formerly in his employ. Mr. Leary belonged to the Hardware Club and Knights of Columbus, but was essentially a man who valued his home and was much devoted to the welfare of his mother and two sisters, having never married.

THE CHARLES PARKER COMPANY, 32 Warren street, New York, has on exhibition a Double Barrel Skeleton Parker Shot Gun, showing the entire interior mechanism in action. It is so cut away in the metal and wood parts that various portions of the interior, top, bottom and sides, are revealed, so that salesman, sportsman, buyer or any one interested may actually see any part in action, and the relation that each bears to the other. Of special interest is the working of safety, cocking and automatic ejector devices.

Stanley Rule & Level Company's New Catalogue.

THE Stanley Rule & Level Company, New Britain, Conn., and 107 Chambers street, New York, has issued catalogue No. 102, containing 128 pages. The lines shown in great variety include Rules, Plumbs and Levels, Try and Miter Squares and T Bevels, Gauges, Planes, Scrapers, Miter Boxes, Bit Braces, Screw Drivers, Awls, Spoke Shaves, Brackets, &c., with a large assortment of specialties in woodworkers' tools of a miscellaneous character. The extensive works are shown on two pages in front, and at the back are 12 pages relating to telegraph code, code index, original packages and contents, weights and measurements, all helpful to merchants whether in domestic or foreign trade, but particularly to exporters and buyers abroad. There is also a No. 101 catalogue identical, except in size, of which there is a limited edition.

The Eben Hardware Mfg. Company.

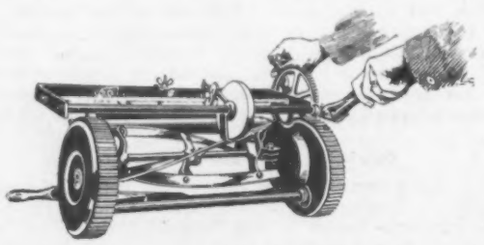
The Eben Hardware Mfg. Company, Minerva, Ohio, is about commencing the manufacture of builders' hardware and hardware specialties, light gray castings and metal stampings. Round end sash pulleys will be included among iron castings. First on the list of specialties will be sink strainers. Instantaneous ice cream freezers and aluminum phonograph horns.

The Eli Self-Feed Three Stroke Hay Press No. 6.

The Collins Plow Company, Quincy, Ill., has put on the market a self-feed three stroke hay press. It has a strong plate bale chamber, the side plates also are of steel and the corner angle supports extend the entire length of the bale chamber, doing away with the necessity of a spliced chamber. There is an easy crossing over the pitman, and the step is comparatively low. A self-feeder is combined with the press, so that after the hay is forked into the hopper the self-feeder does the heavy work of forcing the charges down into the baling chamber. The leverage of the self-feeder is such that it increases as the feeder approaches the bottom of the bale chamber. The leverage of the power mechanism is also accumulative. The press is alluded to as being capable of making exceptionally neat bales with smooth sides and neatly folded overlaps. The tension device grips the bale on all four sides.

The Unique Lawn Mower Grinder.

The grinder shown herewith will sharpen any lawn mower up to 22 in. in width, either left or right hand blades, including the stationary blade. The grinder is attached to the wooden roller of the mower for operating, the roller forming a hinge so that the grinder may be



The Unique Lawn Mower Grinder No. 40, for Sharpening Mowers up to 22 In., Either Left or Right Hand Blades.

raised like the carriage on a typewriter. The stone follows the screw rod to do even grinding. To grind the stationary blade the steel gauge is placed on the top of the blade, thereby holding the stone at the proper hight to grind the blade at the correct angle. The machine is offered by Royal Mfg. Company, Lancaster, Pa., which states that a mower can be ground in 10 min. with this French corundum stone.

Chicago Triplex Spring Butts.

Several features of merit are claimed for the triplex spring butt, made by the Chicago Spring Butt Company, Chicago, Ill., and here illustrated. Among those prominently referred to are the construction of the body in one integral piece which is reinforced by extra thickness of metal at the points of maximum stress; bearings so designed as to produce the least possible friction and a ratchet locking device in which the ball tip engages with the flange, and by the natural spring of the metal is securely retained. Fig. 1 represents the single acting spring butt. These if desired can be furnished with reverse springs to throw the door open when released. They are especially adapted to fire engine and other doors which are required to open when released. The

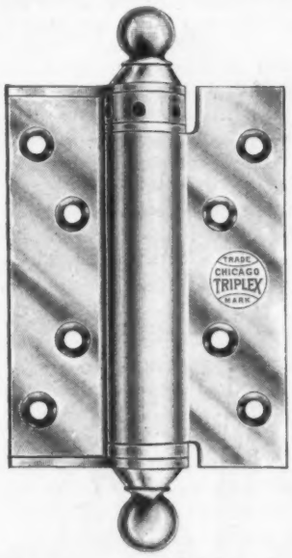


Fig. 1.—Single Acting Triplex Spring Butt.

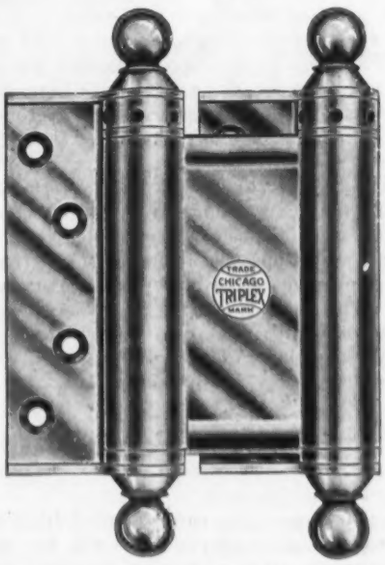


Fig. 2.—Double Acting Triplex Spring Butt.

double acting triplex butt is shown in Fig. 2, and is furnished in steel with a variety of finishes, and are also made in bronze or brass metal.

The Wachter Hardware Company, Pender, Neb., suffered a recent loss by fire which destroyed their implement store and warehouse. The main store suffered but little damage. It is the purpose of the company to immediately rebuild and restock the stores destroyed.

The Merrifield Hardware Company has succeeded to the business of Cavanaugh & Merrifield, Kent, Wash., handling Shelf and Heavy Hardware, Stoves, Tinware, Housefurnishings, Window Glass, Paints, Oils and Sporting Goods.

The Shickley Hardware Company, Shickley, Neb., has begun the erection of a new building. The company handles Hardware, Stoves, Tinware, Paints, Oils, Furniture, &c.

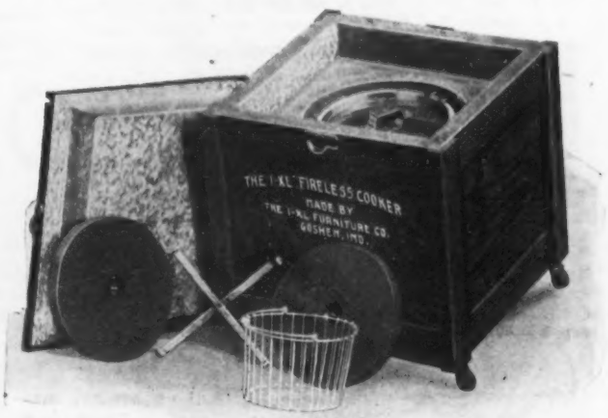
The Sensation Safety Razor.

The frame of the safety razor shown herewith is of two parts only and the blade is made with a double bevel, so as to make it impossible to put it together wrong. The cross bar which holds the blade in place slips on two engaging points that increase the tension as the bar is moved toward the back of the frame. The manufacturer emphasizes the fact that with this style of holding the flexible blade is absolutely rigid, giving the safety all the advantages of a standard razor. The handle is turned from special metal not too heavy, so that the razor as a whole balances nicely in the handle. The knurling gives a secure hold, and the construction of the head of the frame is such that the user can secure continuous use of the blade during an ordinary shave, there being clearance back of the edge of the comb for lather. The blades are made from prepared steel, rolled to an accurate gauge. Each blade is honed and tested before sending it out, and is wrapped in anti-rust paper with an outer envelope to avoid rust, and the edges are also protected against ordinary handling. The razor is made by the Geneva Cutlery Company, Geneva, N. Y., in a variety of finishes, and can be packed according to customer's order.

The Sensation Safety Razor, the Blade of Which Is Held by a Cross Bar.

The I-X-L Fireless Cooker No. 1.

The I-X-L Furniture Company, Goshen, Ind., has put on the market fireless cookers in three sizes with one, two and three compartments, the one compartment cooker being shown herewith. These are air-tight cookers, constructed, it is explained, on scientific principles.



The I-X-L Fireless Cooker No. 1, for Roasting, Broiling, Baking, &c.

The outer case is of kilndried oak, paneled on four sides and top and fitted with antique copper locks. The finish is golden oak, golden oak waxed or weathered oak waxed. The inside of the cooker is constructed of a non-rusting

metal and formed especially for the cooker. The space between the inside and outside case is packed with what is claimed to be the best of non-heat-conducting material on the market. Neither hay, straw, shavings, excelsior, wood fiber, saw dust or bran is used. With this construction the temperature of the cooking articles is kept high for many hours. The roasting attachment, which is included with the three cookers, permits roasting, broiling or baking; cooking anything in fact that can be started on a stove. The one compartment is provided with two 8¾ x 1¼ in. hot plates—for baking or roasting; one 9 qt. enameled kettle, with aluminum cover; one vegetable boiler, two racks for hot plates and hooks for handling same. It is stated that the cookers will save from 50 to 75 per cent. of the fuel bill, and of the time and trouble in cooking; also that they will cook any kind of food and retain the native flavor and all the nutriment, and that they eluminate all danger of boiling dry or burning.

The Farm Pump Engine.

A small but powerful gasoline engine designed for attachment to farm pumps has just been placed on the market by the Fuller & Johnson Mfg. Company, Madison, Wis. The illustration of the engine, Fig. 1, shows a sectional view through the flywheel end, and the manner of its operation in this connection is illustrated in Fig. 2. Strength and simplicity of construction, together with adaptability to the service required, are the features which command particular attention. The engine is of the four-cycle vertical type, with air cooled cylinder 3½-in. bore, 3½-in. stroke, and has an adjustable speed of from 500 to 600 rev. per min. Careful attention has been given to the oiling system, which, as regards the cylinder and other parts, is described as very effective. Power is transmitted from the engine through a series of extra wide large toothed gears to the pitman crank,

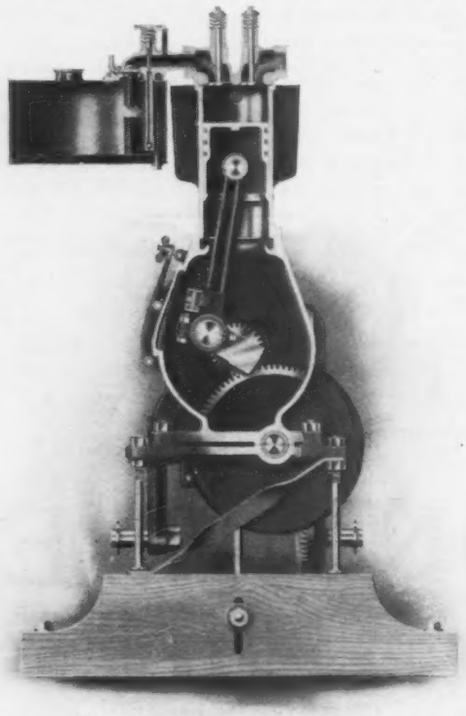


Fig. 1.—The Farm Pump Engine.—View of the Engine from the Flywheel End.

which operates the pump rod. All of the gears are machine cut, except the two operating the pump rod, and are protected with shields as a measure of safety and to keep out the dust and dirt. The speed control is effected through a governor located on the inside of the flywheel, which cuts off the gasoline and electricity when no explosion is needed to keep up the speed of the engine. The fuel tank mounted on the engine is made of thick sheet steel heavily galvanized. It is provided with an outer jacket between which and the tank proper is a space of 1½ in. all around. Being self-contained on its own base, no special foundation is required for the engine, which may be set up on any good well platform, and when bolted to the pump, as shown in Fig. 2, is ready for operation. By attaching a pulley to the driving shaft any light hand tools or apparatus used about the farm, such as cream separators, fanning mills, washing ma-

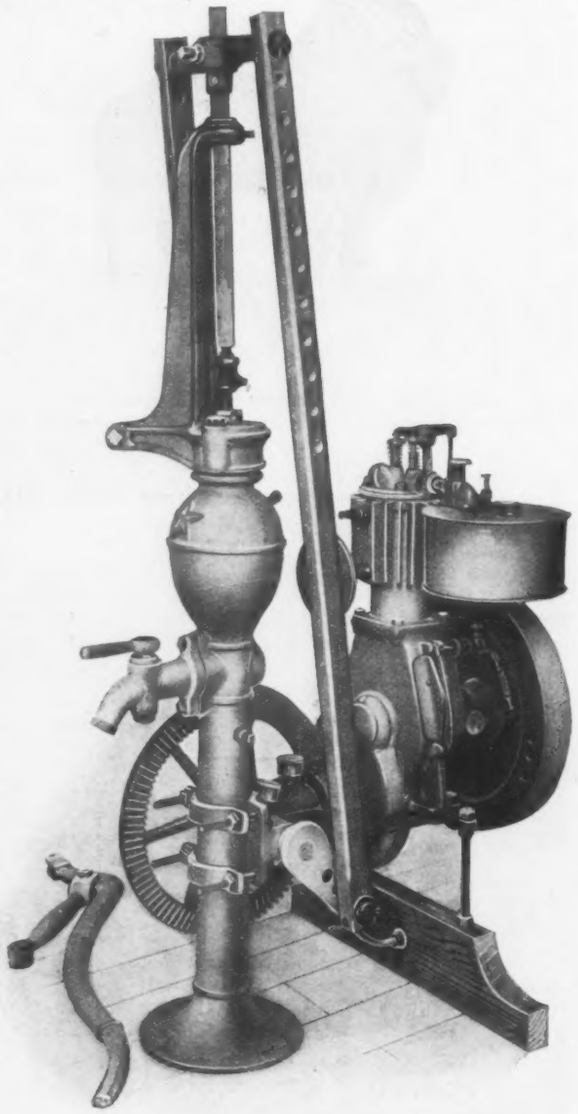


Fig. 2.—Farm Pump Engine Bolted to Pump.

chines, grind stones, &c., can be run with the engine. Without battery box, ignition coil, tools, &c., the engine weighs 240 lb., or, when crated for shipment, 330 lb.

The Mascot Electric Welded Baseball Mask.

The Hamblin & Russell Mfg. Company, Worcester, Mass., is introducing the electric welded baseball mask shown in the accompanying illustration. The mask is constructed of one piece of wire, each joint being electric welded. Special drawn hard spring steel wire is used to give the greatest strength with the least obstruction to the eyes. Every joint is solid and rigid, reinforcing each other, and well adapted to hard usage. The company states that it has the exclusive right to make and sell electric welded masks under patents.

The Mascot Electric Welded Baseball Mask.

Arcade Cast Iron and Steel Toys.

The Arcade Mfg. Company, Freeport, Ill., which makes a large variety of metal toys, has enlarged its line of animal banks, so that it now includes roosters, horses,

The Lion Bank with Large Capacity.

bears, cats, pigs, dogs, elephants, &c. The lion bank is illustrated herewith. This is finished in a brilliant gold lacquer, outlined with crimson and black. It is 5 in. long and 4 in. high, and has a large capacity. Another of the company's recent productions is the steel Panama dump wagon, which has a larger capacity than if made of cast

The Arcade Steel Panama Dump Wagon.

iron. It is alluded to as being very durable and calculated to withstand a large amount of rough usage without showing its effects. The wagon is 8 in. long, without the 24-in. wire handle, and 6 in. high. As shown the dumping is accomplished by means of a lever handle.

PAINTS, OILS AND COLORS

Animal, Fish and Vegetable Oils—

	℔ gal. bbl.	lots
Linseed, Western, Raw	.55	@57
State, Raw	.60	@61
City, Raw	.61	@62
Boiled, 1¢ ℔ gal. advance on Raw.		
Raw, Calcutta, in bbls	.73	@..
Lard, Prime Winter	.88	@95
Extra No. 1	.57	@58
No. 1	.48	@50
Cotton-seed, Crude, f.o.b. mill		@..
Summer, Yellow, prime	5.50	@5.55
Summer, White	5¾	@ 6
Yellow, Winter	5¾	@ 6
Tallow, Acidless	.57	@..
Menhaden, Brown, Strained	.32	@33
Northern, Crude	.22	@23
Southern	.23	@..
Light Strained	.32	@33
Bleached Winter	.36	@..
Extra Bleached Winter	.38	@..
Cocoanut, Ceylon ℔ lb	7.50	@7.55
Cochin ℔ lb	7⅞	@..
Cod, Domestic, Prime	.38	@..
Newfoundland	.40	@..
Red Elaine	.43	@47
Saponified ℔ lb	5⅝	@ 6¾
Olive, Yellow	1.35	@1.40
Neatsfoot, Prime	.55	@56
Palm, Lagos ℔ lb	5⅞	@ 6

Mineral Oils—

	℔ gal.	
Black, 29 gravity, 25@30 cold test	12½	@13
29 gravity, 15 cold test	.13	@13½
Summer	.12	@12½
Cylinder, light filtered	.20	@20½
Dark, filtered	17½	@18
Paraffine, 903-907 sp. gravity	.14	@14½
903 sp. gravity	.13	@13½
883 sp. gravity	10½	@11
Red	.13	@13½

Miscellaneous—

Barytes:		
White, Foreign ℔ ton	$18.50	@20.50
Amer., floated ℔ ton	17.00	@18.00
Off color ℔ ton	12.50	@15.00
Chalk in bulk ℔ ton	3.00	@ 3.40
China Clay, Imported ℔ ton	11.50	@18.00
Cobalt, Oxide ℔ 100 lb	1.45	@ 2.60
Whiting, Commercial ℔ 100 lb	45	@50
Gilders ℔ 100 lb	.52	@ .64
Ex. Gilders ℔ 100 lb	.56	@ .68

Putty, Commercial—℔ 100 lb

In bladders	$1.70	@2.00
In bbls. or tubs, 100 lb	1.20	@1.45
In 1 lb to 5 lb tins	2.65	@3.25
In 12½ to 50 lb tins	1.50	@1.90

Spirits Turpentine—℔ gal.

In Oil bbls	56½	@57
In Machine bbls	57	@57½

Glue—

	℔ lb	
Cabinet	12	@15
Common Bone	7½	@ 9
Extra White	18	@24
Fish, liquid, 50 gal. bbls., per gallon	60	@1.20
Foot Stock, White	12	@14
Foot Stock, Brown	9	@11
German Common Hide	10	@12
German Hide	12	@18
French	10	@40
Irish	13	@16
Low Grade	10	@12
Medium White	14	@19

Gum Shellac—

	℔ lb	
Bleached, Commercial	16	@17
Bone Dry	20	@21
Button	29	@30
Diamond I	26	@..
Fine Orange	20	@21
A. C. Garnet	18	@18½
Light Orange	17	@19
Kala Button	10	@11
D. C	26	@..
Octagon B	22	@23
T. N	17	@17½
V. S. O	24	@25

Colors in Oil—

	℔ lb	
Black, Lampblack	.12	@14
Blue, Chinese	.36	@46
Blue, Prussian	.32	@36
Blue, Ultramarine	.13	@16
Brown, Vandyke	.11	@14
Green, Chrome	.12	@16
Green, Paris		@24
Sienna, Raw	.12	@15
Sienna, Burnt	.12	@15
Umber, Raw	.11	@14
Umber, Burnt	.11	@14

White and Red, Lead &c.—

	℔ lb	
Lead, English white, in Oil	10½	@10⅝
Lead, American White:		
Dry and in Oil, 100, 250 and 500 lb kegs	6¾	
Dry and in Oil, 25 and 50 lb kegs	7	
Dry and in Oil, 12½ lb kegs	7¼	
In Oil, 25 lb tin pails	7¼	
In Oil, 12½ lb tin pails	7¾	
In Oil, 1, 2, 3 and 5 lb tin cans, ass't	8¾	
Red Lead and Litharge:		
In 100 lb kegs	7	
In 25 and 50 lb kegs	7¼	
In 12½ lb kegs	7½	
In lots of less than 500 lbs. ½¢ ℔ lb advance over above prices of White and Red Lead and Litharge.		

Lead, American. Terms: On lots of 500 lbs and over, 60 days, or 2% for cash if paid in 15 days from date of invoice.

Zinc, Dry—

	℔ lb	
American, dry	5½	@ 5⅝
Red Seal (French process)	6¾	@ 7
Green Seal	7¼	@ 7½
German Red Seal (French process)	7¼	@ 7⅜
Green Seal	7⅝	@ 8
White Seal	8¾	@ 9
French, Red Seal	8⅝	@ 8⅞
Green Seal	10⅜	@10⅝

Dry Colors—

	℔ lb	
Black, Carbon	.5	@10
Black Drop, American	.3½	@ 8
Black Drop, English	.5	@15
Black, Ivory	.16	@20
Lamp, commercial	.3	@ 5
Blue, Celestial	.4	@ 6
Blue, Chinese	.30	@31
Blue, Prussian, Domestic	.28	@30
Blue, Ultramarine	.5	@15
Brown, Spanish	½	@ 1
Carmine, No. 40	2.65	@2.75
Green, Chrome, ordinary	3½	@ 5
Green, Chrome, pure	.17	@25

Metallic Paint. ℔ ton,		
Brown	$16.50	@$22.00
Red	$14.00	@$18.00
Ocher, American ℔ ton	$12.00	@15.00
American Golden	4	@ 5
French	1¼	@ 2
Foreign Golden	3	@ 4
Orange Mineral, English	.10	@12
French	12¾	@13
German	.12	@13
American	8½	@10
Red, Indian, English	5	@ 7
American	3	@ 3½
Red, Turkey, English	4	@10
Red, Tuscan, English	7	@10
Red, Venetian, Amer. ℔ 100 lb	$0.75	@1.50
English ℔ 100 lb	$1.15	@1.60

Sienna, Italian, Burnt and Powdered	.3	@ 9
Italian, Raw, Powdered	.5	@ 7
American, Raw	2¼	@ 3
American Burnt and Pow'd	2¼	@ 3
Talc, French ℔ ton	$18.00	@25.00
American ℔ ton	15.00	@25.00
Terra Alba, French ℔ 100 lb	.80	@1.00
English ℔ 100 lb	.90	@1.00
American ℔ 100 lb, No. 1	.75	@ .80
American ℔ 100 lb, No. 2	.60	@ .65
Umber, T'key, Bnt. & Pow.	2¾	@ 3
Turkey, Raw and Powdered	2¾	@ 3
Burnt, American	2	@ 2½
Raw American	2	@ 2½
Yellow Chrome, Pure	12¼	@13
Oxide Red, American	2	@ 7½
Vermilion, English, Imported		@70
Chinese	$0.90	@1.00

THE IRON AGE

The oldest paper in the world devoted to the interests of the Hardware, Iron, Machinery and Metal Trades, and a standard authority on all matters relating to those branches of industry.

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Current Hardware Prices.

General Goods.—Goods which are made by more than one manufacturer are printed in *Italics*. The prices named represent those obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are usually given to larger buyers.

Special Goods.—Quotations printed in small type (Roman) relate to goods of particular manufacturers, who request the publication of the prices named and are responsible for their correctness. They usually represent the prices to the small trade, lower prices being generally obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33⅓ @ 33⅓ & 10% signifies that the price of the goods in question ranges from 33⅓ per cent. discount to 33⅓ and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued annually, a book of 376 pages, which is sent free of charge to every subscriber to *The Iron Age*. It gives a classified list of the products of our advertisers and thus serves as an up-to-date DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—"The Iron Age Standard Hardware Lists," 218 pages, price $2, prepaid, contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters, Blind—

North's 10%
Upson's Patent.....25%
Zimmerman's—See Fasteners, Blind.

Window Stop—

Ives' Patent.....25%
Ives' Stop Bead Screws and Washers 25%
Taplin's Perfection.....25%

Anti—Rattlers—

Fernald Mfg. Co, Burton Anti-Rattlers, ₱ doz. pairs, Nos. 1, $0.75; 2, $0.60; 3, $0.65; 4, $1.00; 5, $0.50.
Fernald Quick Shifter, ₱ doz. pairs .....$2.00@$3.00
Spitzli Quick Shifter, ₱ doz. pairs .....$1.65@$1.75

Anvils—American—

Eagle Anvils .....₱ lb @9 ¢
Hay-Budden, Wrought.....9½@9¾ ¢
Trenton .....₱ lb 9½@9¾ ¢

Imported—

Swedish Solid Steel Paragon, ₱ lb .....10@10½ ¢
Peter Wright & Sons, ₱ lb, 84 to 349 lb, 10½ ¢; 350 to 600 lb, 11¢.

Anvil, Vice and Drill—

Millers Falls Co., $18.00.....15&10%

Augers and Bits—

Com. Double Spur.....80%
Jennings' Patn., Bright.65&10@70%
Black Lip or Blued...65@65&5%
Boring Mach. Augers.....70%
Car Bits, 12-in. twist.....40&10%
Ford's Auger and Car Bits.....40&5%
Ft. Washington Auger Co.....35%
Forstner Pat. Auger Bits.....25%
C. E. Jennings & Co.:
No. 10 ext. lip. B. Jenninga' list, 25&7½%
No. 30, B. Jennings' list.....50%
Russell Jennings'.....25&15&2½%
L'Hommedieu Car Bits.....15%
Mayhew's Countersink Bits.....45%
Pugh's Black.....20%
Pugh's Jennings' Pattern.....35%
Snell's Auger Bits.....60&10%
Snell's Belt Hangers' Bits.....60%
Snell's Car Bits, 12-in. twist.....60%
Snell's King Auger Bits.....50%
Snell's Star Auger Bits.....50&10%
Swan's Auger Bits.....65&10@70%
Swan's, Jennings' Pattern.....50%

Bit Stock Drills—

See *Drills, Twist.*

Expansive Bits—

Ford's, Clark's Pattern.....66⅔%
C. E. Jennings & Co., Steer's Pat..25%
Lavigne Pat., small size, $18.00; large size, $26.00.....60&10%
Swan's 60%

Gimlet Bits—

Per gro.
Common Dbl. Cut.....$3.00@3.25
German Pattern, Nos. 1 to 10, $4.75; 11 to 13, $5.25

Hollow Augers—

Bouncy Pat., per doz..$5.50@6.00
Ames .....20&10%
Universal 20%

Ship Augers and Bits—

Ship Augers.....40&10@50%
Ford's .....33⅓&5%
C. E. Jennings & Co.:
L'Hommedieu's 6%
Watrous' .....33⅓&7½%
Snell's 50%

Awls—

Elmore Tool Mfg. Co.:
Tinners' and Brad Awls.....55&7½%
Scratch Awls.....60%

Axes—

Single Bit, base weights: Per doz.
First Quality.....$4.75@5.00
Second Quality.....$4.25@4.50
Double Bit, base weights.
First Quality.....$7.00@7.50
Second Quality.....$6.50@6.75

Axles— *Iron or Steel.*

Concord, Loose Collar...4¼@4½¢
Concord, Solid Collar....4½@5 ¢
No. 1 Common, Loose...3½@4 ¢
No. 1½ Com., New Style.4¼@4¾¢
No. 2 Solid Collar.....4¼@4¾¢
Half Patent:
Nos. 7, 8, 11 and 12.....70%
Nos. 13 to 14.....70%
Nos. 15 to 18...70&10@70&10&5%
Nos. 19 to 22...70&10@70&10&5%

Boxes, Axles—

Common and Concord, not turned .....lb., 5@6¢
Common and Concord, turned, lb., 6@7¢
Half Patent.....lb., 9½@10¢

Bait— Fishing—

Hendryx:
A Bait.....20%
B Bait.....25%
Competitor Bait.....20&5%

Balances— Sash—

Caldwell new list.....50&10%
Pullman .....50&10%

Spring—

Light Spring Balances.50&10@60%
Chatillon's:
Light Spg. Balances.....50&10@60%
Straight Balances.....40&10@50%
Circular Balances.....50&10@60%
Large Dial.....30@30&10%

Barb Wire—See *Wire, Barb.*

Bars— Crow—

Steel Crowbars, 10 to 40 lb.... per lb., 2¼@—¢

Towel—

No. 10 Ideal, Nickel Plate..₱ gro. $8.50

Beams, Scale—

Scale Beams.....40@40&10%
Chattillon's No. 1.....30%
Chatillon's No. 2.....40%

Beaters, Carpet—

Holt-Lyon Co.:
No. 12 Wire Coppered ₱ doz. $0.80; Tinned $0.85
No. 11 Wire Coppered ₱ doz. $1.15; Tinned $1.20
No. 10 Wire Tinned.....₱ doz. $1.50

Beaters Egg—

Dover Stamping & Mfg. Co.:
Genuine Dover, per gro., No. 1, Tumbler Size, $7.50; No. 2, Family Size, $7.50; No. 3, Extra Family Size, $24.00; No. 4, Hotel Size, $30.00.
Holt-Lyon Co.:
Holt, per doz., No. 5, Jap'd, $0.80; No. A, Jap'd, $1.15; No. B, Jap'd, $1.85; No. 6, Jap'd, $1.65.
Lyon, Jap'd, per doz., No. 2, $1.35.
Taplin Mfg. Co.:
Improved Dover, per gro., No. 60, $6.00; No. 75, $6.50; No. 100, $7.00; No. 102, Tin'd, $8.50; No. 150, Hotel, $15.00; No. 152, Hotel Tin'd, $17.00; No. 200, Tumbler, $8.50; No. 202, Tumbler Tin'd, $9.50; No. 300, Mammoth, per doz., $25.00.

Bellows—

Blacksmith, Standard List:
Split Leather.....60@60&10%
Grain Leather.....50@50&10%

Hand—

Inch..	*6*	*7*	*8*	*9*	*10*
Doz..	*$4.50*	*5.50*	*6.00*	*7.00*	*7.50*

Molders—

Inch..	*10*	*12*	*14*	*16*
Doz..	*$8.50*	*11.00*	*13.50*	*14.50*

Net Prices

Bells— Cow—

Wrought Cow Bells.....75%
Jersey .....75&10%
Texas Star.....50%

Door—

Home, R. & E. Mfg. Co.'s.....55&10%
Reading Hardware Co.....50%

Hand—

Polished, Brass.....60@60&10%
White Metal.....60@60&10%
Nickel Plated.....50&10%
Swiss .....50&10%
Cone's Globe Hand Bells.....33⅓@35%

Miscellaneous—

Farm Bells.....lb., 2½@3¢
Church and School....60@60&5%

Belting— Leather—

First Quality, Ex. Hy., Strictly Short Lap.....60&10%
Standard .....70&10@70&10&5%
Light Double.....75&10%
Cut Leather Lacing.....45@50%
Leather Lacing Sides, per sq. ft.25¢

Rubber—

Competition (Low Grade). 70&10@75%
Standard .....60&10@70%
Best Grades.....50@50&10%

Benders and Upsetters, Tire—

Green River Tire Benders and Upsetters 20%

Bicycle Goods—

John S. Leng's Son & Co.'s 1909 list:
Chain, Parts, Spokes.....50%
Tubes 60%

Bits—

Auger, Gimlet, Bit Stock Drills, &c.—See *Augers and Bits.*

Blocks Tackle—

Common Wooden.....75@75&10%
Lane's Patent Automatic Lock and Junior 30%
See also Machines, Hoisting.

Boards, Stove—

Paper and Wood Lined.50&10@60%
Embossed .....50&10@60%

Bobs, Plumb—

Keuffel & Esser Co.....33⅓&10%

Bolts

Carriage, Machine, &c.—

Common Carriage (cut thread):
⅜ x 6 and smaller.....75%
Larger and longer.....70%
Common Carriage (rolled thread):
⅜ x 6, smaller and shorter, 75&5%
Phila. Eagle, $3.00 list...80@—
Bolt Ends, with C. & T. Nuts.70%
Machine (Cut Thread):
⅝ x 4 and smaller.....75&5%
Larger and longer.....70&5%

Door and Shutter—

Wrought Iron:
Wrought Barrel Japanned, 80&10&10@85%
Barrel Bronzed.....60&10@70%
Spring .....70&10&10@80%
Square Neck.....75&10@80%
Square .....80@80&10%
Ives' Mortise Door.....25%
Ives' Wrought Door.....25%

Expansion—

P. H. Evans' Crescent.....40@60%
Richards Mfg. Co.....55&10%
Star Expansion Bolt Co.:
Star, Lag Screw Type..60&10&5&2½%
Star, Wood Screw Type.....40%
Star, Machine, Single Wedge.....60%
Star, Machine, Double Wedge.60@10%
Star Toggle Bolts.....60%
Steward & Romain Mfg. Co.:
Style No. 13, Double.....60@10%
Style No. 1, Single.....60@10%
Style No. 100, Dbl. Jaw, Single..55%
Lag Screw.....66⅔%
Star Screw Anchors, Hollow.....40%

Plow and Stove—

Plow .....65&5@70%
Stove .....85&5@85&10%

Tire—

Common Iron.....80%
Norway Iron.....80%
American Screw Co.:
Norway Phila., list Oct. 16, '84...80%
Eagle Phila., list Oct. 16, '84 82½%
Bay State, list Dec. 28, '99.....80%
Franklin Moore Co.:
Norway Phila., list Oct. 16, '84...80%
Eagle Phila., list Oct. 16, '84...82½%
Eclipse, list Dec. 28, '99.....80%
Russell, Burdsall & Ward Bolt & Nut Co.:
Empire, list Dec. 28, '99.....80%
Norway Phila., list Oct. '84.....80%
Eagle 82½%
Shelton Co.:
Tiger Brand, list Dec. 28, '99....80%
Phila., Eagle, list Oct. 16, 1884..82½%
Upson Nut Co.:
Tire Bolts.....80%

Borers, Bung—

Enterprise Mfg. Co., No. 1, $1.25; No. 2, $1.75; No. 3, $2.50 each.....25%

Boxes, Mitre—

C. E. Jennings & Co.....25%
Langdon, New Langdon and Langdon Improved, 20&10%; Langdon Acme .....15&10%

Braces—

Common Ball.....$1.50@$1.75
Barber's .....50&10&10@60&10%
Fray's Genuine Spofford's.....60%
Fray's No. 61, 166, 206, 614.....50%
C. E. Jennings & Co.....50&5%
Mayhew's Ratchet.....40%
Mayhew's Quick Action Hay Patent .....40&10%
Millers Falls Drill Braces.....25&10%
P. S. & W. Co., Peck's Pat Revised List.....60@60&5%

Brackets—

Wrought Steel.....80&5@80&10%
Griffin's Pressed Steel.....75@75&10%
Griffin's Folding Brackets.....70&10%
Stanley's Pressed Steel.....75&10&5%
Stanley's Folding Brackets..70&10&5%
Taplin Victor Handy Egg Beater Bracket .....₱ doz. $1.50

Broilers—

Kilbourne Mfg. Co.....75&20%
Wire Goods Co.....75&10%

Buckets, Galvanized —

M'fr's list, price per gross, subject to discount of 10@7½&5&5 &10&5%.

Quart.....	*10*	*12*	*14*
Water, Light....	*$28.35*	*30.75*	*34.75*
Water, Ex. Heavy	*46.85*	*49.35*	*53.25*
Fire, Rd. Btm...	*33.50*	*35.90*	*39.90*
Well	*37.35*	*41.35*	*45.35*

Butts— Brass—

Wrought 65%
Cast Brass, Tiebout's.....40&10%

Wrought Steel—

BRIGHT.
Light Narrow, Light Reversible .....75&5%
Reversible and Broad.75&10%
Loose Joint, Narrow, Light Inside Blind, &c.....75%
Back Flaps, Table Chest.70%
BRONZED.
Light Narrow, Loose Pin..55%
Light, Loose Pin, Ball Tip.65%
Broad 55%

Extra, 50¢

Cages, Bird—

Hendryx Brass: Series 3000, 5000, 1100, net list; 1200, 15%; 200, 300, 900 ..... 30%
Hendryx Bronze: Series 700, 800....30%
Hendryx Enameled..... 35%

Calks, Toe and Heel—

Blunt, 1 prong, per 100 lb., $3.50@$3.85
Sharp, 1 prong, per 100 lb., $4.00@$4.35
Burke's, 1 pg. Blunt Toe, 3¾¢; 2 pg. Blunt Toe, 4¼¢; 1 pg. Sharp Toe, 4¼¢; 2 pg. Sharp, 4¾¢; Blunt Heel, 4¼¢; Sharp Heel.....4¾¢
Lautier, Blunt, 4@4¼¢; Sharp, 4½@4¾¢
Perkins', Blunt, ℔ lb, 3.65¢; Sharp, 4.15¢

Caps— Primers—

Berdan Primers, $2 per M..20&5%
Primer Shells and Bullets..15&10%
All other primers per M..$1.52@1.60

Cartridges—

Blank Cartridges:
32 C. F., $5.50.....10&5%
38 C. F., $7.00.....10&5%
22 cal. Rim, $1.50.....10&5%
32 cal. Rim, $2.75.....10&5%
B. B. Caps, Con. Ball, Swgd..$1.90
B. B. Caps, Round Ball.....$1.90
Central Fire..... 25%
Target and Sporting Rifle..15&5%
Primed Shells and Bullets..15&10%
Rim Fire, Sporting..... 50%
Rim Fire, Military.....15&5%

Casters—

Bed .....65&10@70%
Plate .....60@60&10%
Philadelphia .....70&10@75%
Acme, Ball Bearing..... 35%
Gem (Roller Bearing).....10&10&10&5%
Steel Gem (Roller Bearing)..... 70%
Standard Ball Bearing..... 45%
Yale (Double Wheel) low list...40&10%

Chain, Proof Coil—

American Coil, Straight Link:

3-16	¼	5-16	⅜	½	⅝
$7.45	4.80	3.85	3.25	3.10	3.00

¾-⅞-1. 1⅛ to 1¼ inch.
$2.90 3.00

German Coil.....70&5%
German Pattern Coil:
6-0 to 1.....70&10&5%
2 and 3.....60&10&10@70%
4, 5 and 6.....50&10@50&10&5%

Halter—

Halter Chains.....60&5@60&10%
German Pattern Halter Chains, list July 24, '97.....70&5%
Covert Mfg. Co.:
Halter ..... 35&5%

Trace, Wagon, &c.-

Traces, Western Standard: 100 pr.
6½—6-3, Straight, with ring..$26.00
6½—6-2, Straight, with ring..$27.00
6½—8-2, Straight, with ring..$30.00
6½—10-2, Str'ght, with ring..$35.00
NOTE.—Add 2c per pair for Hooks Twist Traces: add per pair for Nos. 2 and 3, 2c: No. 1, 3c; No. 0, 4c to price of Straight Link.
Eastern Standard Traces, Wagon Chain, 40.....70&10@—%

Miscellaneous—

Jack Chain:
Iron .....60&10&10@70%
Brass .....60&10&10@70%
Safety and Plumbers' Chain..75%
Gal. Pump Chain....lb., 4½@5%
Bridgeport Chain Co.:
Triumph Halter and Coil..35&2½@40%
Triumph Dog.....50&10@60%
Brown Halter and Coil.....15@50&5%
Covert Mfg. Co.:
Breast, Halter, Heel, Rein, Stallion 40%
Oneida Community:
American Halter, Dog and Kennel Chains .....35&2½@10%
Niagara Dog Leads and Kennel Chains .....45@50&5%
Wire Goods Co.:
Dog Chain..... 70%
Universal Dbl.-Jointed Chain..50&10%

Chain and Ribbon, Sash—

Oneida Community:
Steel Chain..... 60%
Pullman:
Bronze Chain, 60%; Steel Chain, Coppered .....60&10%
Sash Chain Attachments, per set..88¢
Aluminoy Sash Ribbon, per 100 ft. .....$2.00@$5.00
Sash Ribbon Attachments, per set..8¢

Chalk—

Carpenters' Blue....gro., 50@55¢
Carpenters' Red.....gro., 50@55¢
Carpenters' White...gro., 40@45¢

Checks, Door—

Bardsley's 45%
Reading, Ogden.....20&5%
Pullman, per gro.....$54.00
Russwin 33⅓%

Chests, Tool—

American Tool Chest Co.:
Boys' Chests, with Tools.....55%
Youths' Chests, with Tools.....40%
Gentlemen's Chests, with Tools..30%
Farmers', Carpenters, etc., Chests, with Tools 20%
Machinists' and Pipe Fitters' Chests, Empty..... 45%
Tool Cabinets..... 45%
C. E. Jennings & Co.'s Machinists' Tool Chests.....7½%

Chisels—

Socket Framing and Firmer

Standard List..80&10@80&10&10%
Buck Bros..... 30%
C. E. Jennings & Co.:
Socket Firmer No. 10.....25&7½%
Socket Framing No. 15.....25&7½%
Swan's .....66⅔@70%
L. & I. J. White & Co.....30@30&5%

Tanged—

Tanged Firmers.....35&10@40%
Buck Bros..... 30%
C. E. Jennings & Co. Nos. 191, 181..25%
L. & I. J. White Co.....25&5%

Cold— lb.

Cold Chisels, good quality..13@15¢
Cold Chisels, fair quality..11@12¢
Cold Chisels, ordinary.... 9@10¢
Elmore Tool Mfg. Co.:
Cold Chisels.....50&5%

Chucks—

Almond Drill Chucks..... 35%
Almond Turret Six-Tool Chuck..... 40%
Beach Pat. each $8.00.....35&5%
Cincinnati Chuck Co.:
Independent 4-jaw Reversible.....35%
Jacobs' Drill Chucks..... 35%
Morrow Ball Bearing Drill Chucks..35%
Skinner Lathe Chucks:
Independent 35%
Universal, Reversible Jaws..... 35%
Universal, Com. Style Jaws..... 40%
Combination, Reversible Jaws....35%
Combination, Com. Style Jaws...40%
Round Body or Box Body, 2 Chuck Jaws 25%
Geared Scroll Chucks..... 25%
Drill Chucks:
New Model, 25%; Geared Pattern, 25%; Skinner Patent, ...25%
Positive Drive..... 40%
Planer Chucks..... 20%
Standard 45%
Drill Press Vises..... 30%
Face Plate Jaws..... 35%
Standard Tool Co.:
Improved Drill Chuck..... 45%
Union Mfg. Co.:
Combination, Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 17, 40%; No. 21.....35%
Scroll Combinations, Nos. 83 and 84 ..... 30%
Geared Scroll, Nos. 33, 34 and 35..25%
Independent Iron, Nos. 18 and 318.35%
Independent Steel, No. 64..... 25%
Union Drill, Nos. 000, 00, 100, 101, 102, 103, 104.....35%
Union Czar Drill..... 25%
Union Geared Drill Chuck.....25%
Universal, 11, 12, 16, 17, 13, 14, 15..40%
Universal No. 42..... 35%
Iron Face Plate Jaws, Nos. 28, 30, 48 and 50.....35%
Steel Face Plate Jaws, Nos. 70 and 72 ..... 30%
Westcott Patent Chucks:
Lathe Chucks..... 50%
Little Giant Auxiliary Drill.....50%
Little Giant Double Grip Drill....50%
Little Giant Drill, Improved.....50%
Oneida Drill..... 50%
Scroll Combination Lathe.....50%

Clamps—

Carriage Makers', Star, P., S. & W. Co. .....50@50&5%
Besly, Parallel..... 33⅓&10%
Hammer & Co.:
Adjustable ..... 20&5%
Carriage Makers' H. P. Screw.40&5%
Myers' Hay Rack..... 50%
Saw Clamps, see Vises, Saw Filers'.

Cleaners, Drain,

Iwan's Champion, Adjustable.....50%
Iwan's Champion, Stationary....40&5%

Sidewalk—

American Fork & Hoe Co.:
Star, ℔ doz., Socket, $4.00; Shank $3.50
Shank, ℔ doz., X 7½, $3.50; Shank, X 8.....$3.75

Cleavers, Butchers'—

Foster Bros..... 30%
L. & I. J. White Co..... 30%

Clippers, Horse and Sheep—

Chicago Flexible Shaft Co.:
1902 Chicago Horse, each..$10.75
20th Century Horse, each...$5.00
Lightning Belt Horse, each..$15.00
Chicago Belt Horse, each..$20.00
Stewart's Enclosed Gear Ball Bearing Horse, each.....$7.50
Stewart's New Model Sheep Shearing Machine each.$12.75
Stewart Enclosed Gear Shearing Machine, No. 8, each..$9.75
} 25%

Clips, Axle—

Regular Styles.....80&80&10%

Cocks, Brass—

Hardware list:
Plain Bibbs, Globe, Kerosene, Racking, Liquor, Bottling, &c 75%
Compression Bibbs.....75%

Compasses, Dividers, &c.

Ordinary Goods.....75@75&5%

Conductor Pipe,—

L. C. L. to Dealers:

	Gal. Steel.	Charcoal.	Copper.
Northeastern:			
70&10@— %	50&10&7½%		50&10%
Eastern:			
75@— %	50&10&7½%		50&10%
Central:			
75@— %	60%		50&10%
Northwestern:			
75@— %	60%		50&10%
Western:			
70&10@— %	50&12½%		50&5%
Tennessee:			
70&10@— %	50&12½%		50&10%
Southern:			
70&10@— %	50&12½%		50&5%
Southwestern:			
70@— %	50&5%		50&5%

Terms, 60 days: 2% cash 10 days. Factory shipments generally delivered.
See also Eave Troughs.

Coolers, Water—

L. & G. Mfg. Co.:

Galvanized. Lined, side handles, Gal....	2	3	4	6	8
Each	$1.30	1.60	2.00	2.30	3.00
White Enameled Lined, Side Handles: Gal....	2	3	4	6	8
Each	$2.40	2.80	3.50	4.50	5.60
Agate Lined, Side Handles: Gal....	2	3	4	6	8
Each	$3.00	3..0	4.30	5.30	6.60

10%

Coppers, Soldering—

Soldering Coppers, 3 lb. to pair and heavier, 21¢; lighter than 3 lb. to pair.....23¢

Cord— Sash—

Braided, Drab.....lb. 35¢
Braided, White, Com., Nos. 8 to 12, 25¢; No. 7, 25½¢; No. 6, 26½¢.
Cable Laid Italian, lb., No. 18..37¢
Italian, lb., A, No. 18, 25¢; B, 22¢
Common India.....lb., 11@11½¢
Cotton Sash Cord, Tw'ted..18@20¢
Patent Russia.....lb....20¢
Cable Laid Russia.....lb...21¢
India Hemp, Br'd'd.....lb...21¢
India Hemp, Twisted...lb..13@14¢
Patent India, Twisted..lb...17¢
Eddystone, Braided, Nos. 8 to 12, 26¢; 7, 26½; 6, 27½¢.
Harmony Cable Laid Italian, Nos. 7 to10.....℔ lb 23¢
Pullman:
Wire Sash Cord.....10%
Sash Cord Attachments, per 100..$2.00
Samson, Nos. 8 to 12:
Braided, ℔ lb., Drab Cotton, 55¢; Italian Hemp, 40¢@50¢; Linen, 65¢; White Cotton, 50¢; Spot Cord.....50¢
Massachusetts, White...℔ lb 40¢
Massachusetts, Drab...℔ lb 45¢
Phoenix, White, Nos 8 to 12....27¢
} 15%
Silver Lake, per lb.:
A, Drab, 45¢; A, White, 40¢; B, Drab, 40¢; B, White, 35¢; Italian Hemp, 40¢; Linen....57½¢
See also Chain and Ribbon.

Wire, Picture—

Full Length.....90@—%
Short Length.....90&20@—%
Hendryx Standard Wire Picture Cord ..... 90&10%
Turner & Stanton Co. Wire Picture Cord ..... 90&10%

Cradles—

Grain 50%

Crayons—

White Round Crayons, Cases, 100 gro., $8.00, $8.50, $9.00 and $10.00 according to grade.
Zelnicker's Lumber: ℔ gro.
White and Purple, Indelible....$7.50
Blue, Red, Green, Yellow and Terra Cotta, $6.50; Black.....$4.50
Giant Lumber, 5¼ in. x 15-16 in. round, all colors, $12.00; Indelibles, $14.00; Blacks.....$10.00
Genuine Soapstone, Metal Workers', 5 in. x ¼ in. Round, $2.50; 5 in. x ¼ in. Square, $1.75; 5 x ½ x 3-16, $2.50; 5 x 1¼ x 3-16.....$3.00
Suremark, Black, $2.25; Blue, Red and Yellow.....$2.50

Crooks, Shepherds'—

American Fork & Hoe Co.:
Montana ..... ℔ doz. $1.50

Cultivators—

American Fork & Hoe Co.:
Victor Garden.....50&10%

Cutlery, Table—

International Silver Company:
No. 12 M'd'm Knives, 1847, ℔ doz. $3.50
Star, Eagle, Rogers & Hamilton and Anchor..... ℔ doz. $3.00
Wm. Rogers & Son..... ℔ doz. $2.50

Cutters— Glass—

H. H. Mayhew Co.....40&5%

Meat and Food—

Enterprise:

Nos..	5	10	12	22	32
Each	$1.75	$2.50	$2.25	$4	$5

No. 202, $1.50.....40&7½%

P., S. & W. Co.:
Ideal .....40@40&5%
Hales .....60&5%
Little Giant..... ℔ doz. 40@50
Nos.. 305 310 312 320 322
$35.00 $18.00 $44.00 $72.00 $68.00
New Triumph No. 605, ℔ doz. $24.00.
Russwin Food. No. 1, $24.00; No. 2, $27.00; 3, $12.00.....45&10&10%
$15.00 $18.00
Enterprise Beef Shavers.....25@30%

Siaw and Kraut—

Henry Disston & Sons:
Slaw and Kraut Cutters.....35%
Corn Graters..... 30%
J. M. Mast Mfg. Co.:
Slaw Cutters, 1 Knife....℔ doz. $3.00
Combined Slaw Cutter and Corn Grater ..... ℔ doz. $4.00

Tobacco—

Enterprise .....25@30%

Diggers, Post Hole, &c—

Disston's:
Rapid, ℔ doz., $24.00.....25%
Samson, ℔ doz., $34.00.....25%
Iwan's Pat. Post Hole and Well Auger 40%
Vaughan Pattern Post Hole Augers, 4 to 9 in., ℔ doz.....$6.25
Perfection Post Hole Diggers, ℔ doz. $8.25
Split Handle Post Hole Diggers, ℔ doz., $7.25
Hercules Pattern, ℔ doz.....$8.75
Kohler's, ℔ doz., Universal, $14.00; Little Giant, $12.00; Genuine Hercules, $10.00; Invincible, $9.00; Rival, $8.50; Pioneer.....$7.50
Never-Break Crucible Steel Post Hole Diggers 60%

Dressers Emery Wheel—

Sterling Emery Wheel Dressers.....35%
Sterling Wheel Dresser Cutters.....35%

Drills and Drill Stocks—

Blacksmith's Common Drilling Machines .....$1.50@1.75
Breast, Millers Falls.....15&10%
Breast, P., S. & W.....30&10%
C. & C. Ratchet..... 25%
Reversible Ratchet Die Stocks....25%
Forbes Die Stocks..... 5%
Goodell Automatic Drills.50&10&10&10%
Millers Falls Automatic Drills, Graves', per doz., Nos. 1, $4.86; 2, $8.16.
Millers Falls Automatic Drills,33⅓&10%
Noyes Repair Shop Drill No. 10....20%
Ratchet, Parker's..... 40%
Ratchet, Weston's, Styles A and B.50%
Ratchet, Weston's, Styles C, D and F 45%
Ratchet, Weston's, Style H Improved 45%
Ratchet, No. 012..... 50%
Ratchet, Celebrated..... 50%
Ratchet, Whitney's, P., S. & W..50%
Star Drills..... 60%
Star Pipe Drills.....50&10%
Sebco Extension Drills.....40&10&5%
Star Drill Holders.....50&10&10%
Star Drill Points.....50&10&10%

Twist Drills—

Bit Stock.....70@70&10%
Taper and Straight Shank, 65@65&10%

Drivers, Screw—

Buck Bros.' Screw Driver Bits.....30%
Champion 50%
Disston's Screw Drivers, Handles and Ferrules 70%
Elmore Tool Mfg. Co.:
Elmore 60%
Hartford 66⅔%
Indestructible ..... 55&7½%
Standard Neverturn..... 66⅔%
Star ..... 75&5%
Screw Driver Bits..... 25%
Fray's Hol. H'dle Sets, No. 3, $12..50%
Ford's Brace Screw Drivers....40&10%
Gay's Double Action Ratchet.....35%
Goodell's Auto.....65@65&10%
Mayhew's Black Handle..... 45%
Mayhew's Monarch..... 45%
Millers Falls, ℔ doz., Nos. 11, $9.95; 12, $13.73; 20, $8.17; 21, $8.46; 41, $13.43; 42, $17.21.
Swan's:
Nos. 7565 to 7568, 60%; No. 7540 ..... 40&10%

Eave Trough, Galvanized—

Territory.	Gal. Steel.	Copper.
Northeastern..	*75&10&5%*	*50&10%*
Eastern.....	*80%*	*50&10%*
Central.....	*80&10&5%*	*50&10%*
Northwestern..	*80&10&5%*	*50&10%*
Western	*80&5%*	*50&5%*
Tennessee.....	*80&5%*	*50&10%*
Southern.....	*75&10%*	*50&5%*
Southwestern..	*75&10&2½%*	*50&5%*

Terms.—2% for cash. Factory shipments generally delivered.
Note.—Lower prices are quite general owing to market irregularities.
See also Conductor Pipe and Elbows.

Elbows and Shoes—

Factory shipments, all territories:

	Galv. Steel,	Galv. C. I. and Copper.
Sizes 2, 3, 4		*80%*
Sizes 1½, 2½, 3½, 5, 6		*60&10%*
No. 26		*50%*
No. 24		*25%*
Copper Elbows		*50%*

Emery, Turkish—

	¼ to ½.	½ to 2.	Flour.
Kegs .....lb.	5 ¢	5½¢	5½¢
½ Kegs.....lb.	5¼¢	5¾¢	5¾¢
¼ Kegs.....lb.	5½¢	6 ¢	6 ¢
10-lb. cans, 10 in case....	6½¢	7 ¢	6 ¢
10-lb. cans, less than 10.....	10 ¢	10 ¢	8 ¢
Less quantity..	10 ¢	10 ¢	8 ¢

NOTE.—In lots 1 to 3 tons a discount of 10% is given.

Extensions, Bit—

Ford's Auger Bit Extensions....40&5%

Extinguishers—Fire

Royal Mfg. Co. Fire, ₱ doz., $12.00 .....50%

Fasteners, Blind—

Zimmerman's Jap'd and Galv., 65%; Bronze and Plated.....50%
Walling's 50
Upson's Patent.....25%

Cord and Weight—

Ives, ₱ gro., $1.08.....25%
Titan, ₱ gro., $0.66.....25%

Corrugated—

Acme Corrugated Fasteners.....70%

Faucets—

Cork Lined.....50&10@60%
Metallic Key, Leather Lined, .. 60&10@70%
Red Cedar.....40&5@40&10&5%
Petroleum.....70&10@75%
John Sommer's Peerless Tin Key....40%
John Sommer's Boss Tin Key.....50%
John Sommer's Victor Mtl. Key.50&10%
John Sommer's Duplex Metal Key..60%
John Sommer's Diamond Lock.....40%
John Sommer's I. X. L. Cork Lined..50%
John Sommer's Reliable Cork Lined.. 50&10%
John Sommer's Chicago Cork Lined.60%
John Sommer's O. K. Cork Lined....50%
John Sommer's No Brand, Cedar....50%
John Sommer's Perfection, Cedar....40%
Self Measuring:
Enterprise, Self Measuring and Pump, ₱ doz., $36.00.....40&10%
Lane's, ₱ doz., $36.00.....40&10%

Files— Domestic—

Best Brands.....70&10@75&10%
Standard Brands.....75&10@80&10%
Lower Grade....75&10&10@80&10%
Disston's Superfine.....60%
Fitchburg 80
Gold Medal.....70%
Heller Bros.....70&10@75&10%
Liveright Bros., Gold Medal.....70%
McCaffrey's American Standard, 60&10&10%
McCaffrey's Swiss Pattern.....45&10%
Simonds 70%

Fixtures, Fire Door—

Richards Mfg. Co.:
Universal, No. 103; Special, No. 104 .....$3.75
Fusible Links, No. 96.....50%
Expansion Bolts, No. 107.....60&10%

Grindstone—

Net Prices:

Inch	15	17	19	21
Per doz	$3.00	3.25	3.55	4.00

Peck, Stow & Wilcox Co.:

In.	15	17	19	21	24
	$4.00	4.40	4.75	5.50	6.50....20%

Reading Hardware Co.....50&10%

Forks—

American Fork & Hoe Co.:
Iowa Dig-Ezy Potato.....70&5%
Hay, Regular, 3-tine.....45&20&12½%
Hay, Regular, 4-tine.....60&7½&5%
Champion, Hay.....60&12½%
Acme, Hay.....60&20%
Manure, Regular, 4-tine.....65&5%
Manure, Regular, 5 and 6 tine...70%
Champion, Manure.....65&5%
Columbia, Manure.....70%
Acme, 4-tine.....60&10&5%
Round Shoulder Header, 4-tine..65%
Champion, Header.....65%
Dakota, Header.....65%
Kansas Header.....65%
Wood, Barley.....35&5%
Steel, Barley.....66⅔%
Columbia, Spading.....70&7½&5%

Frames— Wood Saw—

White, S'g't Bar, per doz.80@$1.00
Red, S'g't Bar, per doz.$1.00@1.25
Red, Dbl. Brace, per doz.$1.40@1 50

Freezers, Ice Cream—

Qt.....	1	2	3	4	6
Each....	$1.25	$1.60	$1.90	$2.20	$2.80

Fuse— *Per 1000 Feet.*

Hemp $3.75
Cotton 3.20
Waterproof Sgl. Taped.. 3.65
Waterproof Dbl. Taped.. 4.40
Waterproof Tpl. Taped.. 5.15
10&2½%

Gates, Molasses and Oil—

Stebbins' Pattern.....80@80&5%

Gauges—

Marking, Mortise, &c..50@50&10%
Chapin-Stephens Co.:
Marking, Mortise, &c.....50&50&10%
Disston's Marking, Mortise, &c.60&10%
Wire, Brown & Sharpe's.....33⅓%
Wire, Morse's.....25%
Wire, P., S. & W. Co.....25%

Gimlets— Single Cut—

Numbered assortments, per gro.
Nail, Metal, No. 1, $2.00; 2, $2.30
Spike, Metal, No. 1, $4.00; 2, $4.30
Nail, Wood Handled, No. 1, $2.50; 2, $2.60
Spike, Wood Handled, No. 1, $4.50; 2, $4.60

Glasses, Level—

Chapin-Stephens Co.....65@65&10%
Disston & Sons.....60&10%

Glue, Liquid Fish—

Bottles or Cans, with Brush, 25&10@50%

Grease, Axle—

Common Grade...gro.$6.00@$6.50
Dixon's Everlasting, 10-lb. pails, ea. 85¢; in boxes, ₱ doz., 1 lb. $1.20; 2 lb.....$2.00
Helmet Hard Oil.....25%

Griddles, Soapstone—

Pike Mfg. Co.....33⅓@33⅓&10%

Grinders—

Pike Mfg. Co.:
Hand and Foot Power, Pyko Nos. 1, 2, 3; Pyko Primo; Pyko Peerless; Pyko Spiral (foot power).33⅓%
Mower Knife and Tool, $5.00..40&10%
Royal Mfg. Co.:
Hand Power, each, Nos. 01, $1.75; 02, $2.25; 1A, $2.50; 1B $3.2....33⅓%
Foot Power, No. 10, $5.00.....33⅓%
Encased Gears, No. 15. Hand Power, $13.50; Combined Hand and Foot Power, $15.00.....33⅓%
Lawn Mower Grinder, No. 40, $3.75 .....33⅓%
Sickle Grinder, each, No. 20, $5.00 .....33⅓%
Cast or Cut Gears.

Grindstones—

Pike Mfg. Co.:
Improved Family Grindstones, ₱ inch, ₱ doz., $2.00.....33⅓%
Richards Mfg. Co., Eli and Cycle, Ball Bearing, mounted.....40%

Grips, Nipple—

Perfect Nipple Grips.....40&10&2%

Halters and Ties—

Cow Ties.....70&10@—%
Bridgeport Chain Co.:
Triumph Coil and Halters.35&2½@40%
Brown Coil and Halters...45@50&5%
Brown Cow Ties.....50&5@50&10&5%
Brown Tie Outs.....70&10@75&5%
Covert Mfg. Co.:
Web .....30&2%
Jute Rope.....35
Sisal Rope.....20%
Cotton Rope.....45
Hemp Rope.....45%
Oneida Community:
Am. Coil and Halters.....40@40&5%
Am. Cow Ties.....45@50%
Niagara Coil and Halters...45@50&5%
Niagara Cow Ties.....45&5@50&10&5%

Hammers—

Handled Hammers—

Heller's Machinists'..65&10@65&10&10%
Heller's Farriers'.....40@40&10%
Peck, Stow & Wilcox Co.:
Crucible Steel.....50%
Farriers' 50%
Riveting 50%
Machinists' 50%
Blacksmiths' 50%
Elmore Shoemakers' Hammers.....75%
Victor Magnetic Tack, ₱ gro....$7.75

Heavy Hammers and Sledges—

Under 3 lb., per lb., 50¢...80&10%
3 to 5 lb., per lb., 40¢...80&10&10%
Over 5 lb., per lb., 30¢..80&10&10%

Handles—

Agricultural Tool Handles

Axe, Pick, &c....60&10@60&10&5%
Hoe, Rake, &c.....40%
Fork, Shovel, Spade, &c.:
Long Handles.....40%
D Handles.....40%

Cross-Cut Saw Handles—

Atkins' 40%
Disston's Handles and Saw Tabs..45%

Mechanics' Tool Handles—

Auger, assorted...gro.$3.00@$3.50
Brad Awl.....gro.$1.65@$1.75
Chisel Handles, Ass'd, per gro.:
Tanged Firmer, Apple, $2.40@ $2.65; Hickory.....$2.15@2.40
Socket Firming, Apple, $1.75@ $1.95; Hickory.....1.60@1.75
Socket Framing, Hickory, $1.60@$1.75
File, assorted....gro.$1.30@$1.40
Hammer, Hatchet, &c.. 60&10@60&10&5%
Hand Saw, Varnished, doz., 80¢ 85¢; Not Varnished.....65@75¢
Plane Handles: Jack, doz., 30¢; Fore, doz...45¢
Chapin-Stephens Co.:
Carving Tool.....30@30&10%
Chisel .....60@60&10%
File and Awl.....60@60&10%
Saw and Plane.....30@30&10%
Screw Driver.....33@30&10%
Millers Falls Adj. and Ratchet Auger Handles .....15&10%
Nicholson Simplicity File Handle ... ₱ gro. $0.85@$1.50
J. L. Osgood:
Indestructible File and Tool, ₱ gro., No. 1, $8.00; No. 2, $5.50; No. 3, $9.00; No. 4, $9.50; No. 5, $10.00.....gro. lots 10%
W. A. Zelnicker Supply Co.:
Hammer, ₱ doz., 12 in., $2.00; 14 in., $2.00; 16 in., $2.30; 18 12., $2.50; 20 in., $2.79; 22 in., $3.00; 24 in., $3.30; 26 in., $3.50; 30 in., $3.80.
Sledge, ₱ doz., oval, 30 in., $3.80; octagon, 30 in., $3.80; oval, 36 in., $4.00; octagon, 36 in. $4.20. 50%
Axe, ₱ doz., 28 to 34 in., $5.60; 36 in., $5.80.
Adze, ₱ doz., 36 in., $5.80; 36 in., $7.80.
Pick, ₱ doz., R. R., 36 in., $8.00; coal, 34 in., $5.80.
Hatchet, ₱ doz., 12 to 14 in., $2.00

Hangers—

NOTE—Barn Door Hangers are generally quoted per pair, without track and Parlor Door Hangers per double set with track, &c.

Chicago Spring Butt Co.:
Friction 25%
Oscillating 25
Big Twin.....25%
Chisholm & Moore Mfg. Co.:
Baggage Car Door.....50%
Elevator 30%
Railroad 50%
Cronk & Carrier Mfg. Co.:
Loose Axle.....60&10%
Roller Bearing.....70%
Griffin Mfg. Co.:
Solid Axle, No. 10, $12.00..60&10%
Roller Bearing, No. 11, $15.00, 60&10%
Roller Bearing, Ex. Hy., No. 22 $18.00.....60&10%
Bull Dog, $24.00.....70%
Lane Bros. Co.:
Parlor, Ball Bearing, $1.00; Standard, $3.15; No. 105, $2.85; New Model $2.80; New Champion per set of 4 Hangers, complete with track.....$2.25
Barn Door, Standard.....60&10%
Hinged .....net $6.08
Covered .....60&5%
Special .....70&5%
Trolley Hangers and track...50%
Lawrence Bros.:
Cleveland .....70&7½%
Clipper, No. 75.....60%
Crown .....55&10%
Cyclone, No. 40.....net $6.50
Tandem, No. 50.....net $7.50
New York.....55&10%
Trolley, No. 30, ₱ pair.....$1.25
McKinney Mfg. Co.:
Roller Bearing, Nos. 1 and 2..70%
Anti-Friction 60%
Hinged Hangers, King Charm.60%
Richards Mfg. Co.:
Hangers, Nos. 47, 48, 147, 247, 60&5%
Pioneer Wood Track, No. 3..$2.25
Roller B'r'g St'l Track No. 12.$2.20
Roller B'r'g St'l Track No. 13,$2.50
Roller B'r'g, Nos. 39, 41, 43, 70&7½%
Hero, Adj. Track No. 19..50&10%
Adjustable Track Tandem Trolley Track No. 16.....50&10%
Seal, Steel Track No. 8.....$2.25
Auto Adj. Track No. 22..50&5%
Trolley B, D, No. 17, $1.25; F. D. No. 120, $2.25; No. 121, $2.45; No. 150.....$2.50
Safety Underwriters F. D. No. 101 .....50%
Tandem No. 41..2½ and 3 60&10%
Palace, Adjustable Track, No. 132 .....50&5%
Royal, Adjustable Track No. 122 .....50&10%
Ives' Wood Track No. 1.....$2.25
Trolley B, D, No. 20.....50&10%
Trolley B, D, No. 24, $1.30; No. 27, $1.40; No. 28.....$1.60
Roller Bearings, Nos. 37, 38, 39, 41, 43, 44, Sizes 1 and 2 70&7½%
Anti-friction, No. 42; No. 44, sizes 2½ and 3.....60%
Hinged Tandem No. 48....60&5%
Folding Door B. B. Swivel No. 135 .....40%
Myers' Stayon Hangers.....60%

Hangers— Garment—

Pullman Trouser, ₱ gro., No. 1 $9.00; No. 4, $21.00; No. 5, $16.50; No. 8, Black Enamel, $7.50; No. 10, $21.00; No. 12, $8.00; No. 15, Rods, $9.00; No. 18, Loops.....$10.00
Victor Folding.....₱ gro. $9.60

Gate—

Myers' Patent Gate Hangers, ₱ doz. net 50%

Joist and Timber—

Lane Bros. Co.....35%

Hasps—

Griffin's Security Hasp.....50&10%
McKinney's Perfect Hasp, ₱ doz..60%

Hatchets—

Regular list, first qual.50&10@60%
Second quality.....60@60&10%

Heaters, Carriage—

Clark, No. 5, $1.25; No. 5R, $1.50; No. 3, $1.75; No. 3D, $2.00; No. 1, $3.00 .....25%
Big Hit Assortment, ₱ case....$13.80
Leader, ₱ case.....$9.00
Clark Coal, doz.....$0.75
A B C Coal, doz.....$0.60
Sadiron Coal, box 50 pieces.....$0.75

Hinges—

Blind and Shutter Hinges

Surface Gravity Locking Blind: Doz. Sets with Fastenings, No. 1, $0.70; No. 3, $1.25; No. 5, $1.65.
Mortise Shutter.....80%
Mortise Reversible Shutter..80%
North's Automatic Blind Fixtures, No. 2, for Wood, $9.00; No. 3, for Brick, $11.50.....10%
Charles Parker Co.....70@75%
Parker Wire Goods Co.
Hale & Benjamin Automatic Blind Hinges 20%
Hale's Blind Awning Hinges, No. 110, for wood, $9.00; No. 111, for brick, $9.00.....20%
Reading's Gravity.....50&10%
Stanley's Steel Gravity Blind Hinges, No. 1647½, ₱ doz. sets, without screws, $1.00; with screws, $1.30.
Wrightsville Hardware Co.:
O. S., Lull & Porter.....75&5%
Acme, Lull & Porter.....75%
Queen City Reversible.....75%
Shepard's Noiseless, Nos. 60, 65, 55 .....75&5%
Niagara, Gravity Locking, Nos. 1, 3 & 5.....75&5%
Clark's O. P., No. 1.....75&10%
Clark's O. P., Nos. 3 and 5....75&5&5
Tip Pat'n, No. 1.....75&10%
Clark's No. 3.....75&5%
Buffalo Gravity Locking, Nos. 1, 3 & 5.....70&10&5%
Shepard's Double Locking.....75
Champion Gravity Locking....75&5%
Pioneer .....75&10%
Empire 65%
W. H. Co.'s Mortise Gravity Locking, No. 2.....60&10%

Gate Hinges—

Clark's or Shepard's—Doz. sets:

No.	1	2	3
Hinges with L't'ch.s	$2.00	2.70	5.00
Hinges only.....	1.25	1.90	3.50
Latches only.....	.70	.75	.35

New England:
With Latch.....doz..@$2.00
Without Latch.....doz..@$1.60
Reversible Self-Closing:
With Latch.....doz..@$1.75
Without Latch...doz....@$1.35
Western:
With Latch.....doz. $1.75
Without Latch.....doz..$1.15
Wrightsville Hardware Co.:
Shepard's or Clark's Hinges and Latches, Hinges only or Latches only, Nos. 1, 2 or 3.....70%

Miscellaneous—

Griffin Mfg. Co., Fleur de Lis Surface Hinges, ₱ doz. prs.....$1.00

Pivot Hinges—

Bommer Bros. Pivot, Ball Bearing 40%
Lawson Mfg. Co., Matchless..50&10%

Spring Hinges—

Holdback, Cast Iron...$6.75@$7.00
Non-Holdback, C'st Iron$6.50@$6.75
J. Bardsley:
Bardsley's Non-Checking Mortise Floor Hinges.....40%
Bardsley's Patent Checking.33⅓%
Bommer Bros.:
Spring Butt Hinges.....40%
Surface Floor, Ball Bearing 40%
Mortise Floor, Ball Bearing.40%
Lavatory Hinges.....40%
Non-Holdback Screen Door, Nos. 2000 and 900.....40%
Holdback Screen Door, No. 900.....₱ gro, $9.00
Chicago Spring Butt Co.:
Chicago Spring Hinges.....25%
Triple End Spring Hinges....50%
Chicago (Ball Bearing) Floor.50%
Garden City Engine House....25%
Keene's Saloon Door.....25%
Lawson Mfg. Co.:
Matchless Spring Hinges..... 30&10&10%
Matchless Jamb Hinges..... 30&10&10%
Lavatory .....50&10%
Surface Floor.....60&10%
Richards Mfg. Co.:
Superior Double Acting Floor Hinges 40%
Shelby Spring Hinge Co.:
Buckeye All Steel Holdback Screen Door.....₱ gr. $9.00
Chief Ball Bearings Floor Hinge 50%
Ball Bearing Door.....25%
No. 777, Sheet Steel Holdb'k. ₱ gr. pr.....$9.00
Superior Spring Hinge Co.:
Superior Floor Hinges.....40%
Spring Hinges.....40%

Extra 10% often given on most of these Hinges.

Wrought Iron Hinges—

Strap and T Hinges, &c.:
Light Strap Hinges....65%
Heavy Strap Hinges....75%
Light T Hinges.....60%
Heavy T Hinges....40&10%
Extra Hvy. T Hinges.65&10%
Hinge Hasps.....40%
Cor. Heavy Strap.....75%
Cor. Ex. Heavy T...65&10%
Screw Hook and Strap. 6 to 12 in..lb. 3½¢; 14 to 20 in..lb. 3½¢; 22 to 36 in..lb. 3 ¢
Screw Hook and Eye:
⅜ to 1 inch.....lb. 8½¢
⅝ inch .....lb. 7½¢
½ inch .....lb. 8½¢

Extra, 5¢ —

Extra 50&10% often given.

Hitchers, Stall—

Covert Mfg. Co., Stall Hitchers..30&2%

Hods— Coal—

M'f'gr's list, price per gross:

Inch	*15*	*16*	*17*	*18*
Galv. Open	*$35*	*$39*	*$42*	*$46*
Jap. Open	*26*	*28*	*31*	*35*
Galv. Funnel	*43*	*48*	*52*	*56*
Jap. Funnel	*33*	*36*	*59*	*43*

10&7½&3%

Masons' Etc.

Cleveland Wire Spring Co.:
Steel Brick, No. 162.....each $1.05
Steel Mortar, No. 158.....each $1.35

Hoes— Eye-

Scovil and Oval Pattern, 60&10@60&10&10%
Grub, list Feb. 23, 1899, 70&10@70&10&10%
D. & H. Scovil.....27½%
Am. Fork & Hoe Co. (Scovil Pattern).....60&5%

Handled—

Cronk's Weeding, No. 1, $2.00; No. 2 $2.50
Star Double Bit.....$2.50
American Fork & Hoe Co.:
Regular, Cotton.....75&10&5&2½%
Crescent, Cultivator.....75&2½%
Mattock, Senior.....70%
Mattock, Junior.....70%
Sprouting.....50%
Tobacco, Harper's.....60⅔&15&10%
Warren.....55&10&10&5%
Ivanhoe.....65&15&10%
Cultivator, B B 6.....70&10&10&5%
Cultivator, B B 6½.....70&10&10&5%
Weeding, Acme.....72½&10&2½%
Scuffle, Lightning.....60&5%

Holders— Bit—

Angular, ₱ doz. $21.00.....45&10%

Broom—

Pullman Broom, ₱ gro.....$9.00

Door—

Bardsley's, Iron, 40%; Brass and Bronze.....50%
Empire.....50%
Pullman.....25%
Richards Mfg. Co.: No. 117, Ever-ready, 40%; Nos. 118, 119, Sure Grip.....50%
Superior.....40%

File and Tool—

Nicholson File Holders and File Handles.....33⅓@40%

Fruit Jar—

Triumph Fruit Jar Holder, ₱ doz. $2.00

Nipple—

Curtis Nipple Holders.....5%

Trace and Rein—

Fernald Double Trace Holder, ₱ doz. pairs.....$1.25
Dash Rein Holder, ₱ doz.....$1.25

Hones—Razor—

Pike Mfg. Co., Belgian and Swaty, 50%; German.....33⅓%

Hooks—Cast—

Bird Cage, Reading.....50%
Clothes Line, Reading List.....50&5%
Coat and Hat Iron, Reading.....50%
Coat and Hat, Bronze Metal, Reading.....33⅓%
Coat and Hat, Wrightsville.....60&5%
Harness, Reading List.....50%

Wire—

Belt, Nos. 1 to 15....75&10@80%
Wire C. & H. Hooks..80@80&10%
Parker Wire Goods Co., King..75&10%
Wire Goods Co.:
Acme, 60&10%; Chief, 75@75&10%; Crown, 75&10@80%; Czar, 70%; Capitol 80%; Czar Harness, 50&10%; Ceiling, 75@80%.

Miscellaneous—

Hooks, Bench, see *Stops, Bench.*
Bush, Light, doz., $6.20; Medium, $6.75; Heavy, $7.65
Grass, best, all sizes, per doz.. $2.75@$3.00
Grass, common grades, all sizes, per doz.....$1.25@$1.50
Hooks and Eyes:
Brass.....60@60&10%
Malleable Iron.....70@70&10%
Covert Mfg. Co. Gate and Scuttle Hooks.....40%
Turner & Stanton Co. Cup and Shoulder.....85&10%
Bench Hooks—See Bench Stops.
Corn Hooks—See Knives, Corn.

Hose, Rubber—

Garden Hose, ¾-inch:
Competition.....ft. 6@6½¢
3-ply Guaranteed....ft. 8½@9¢
4-ply Guaranteed....ft. 9½@12¢
Cotton Garden, ¾-in., coupled:
Low Grade.....ft. 8@ 9c
Fair Quality.....ft. 10@11¢

Irons— Sad-

From ½ to 10.....lb. 2½@2¾¢
Mrs. Potts', cents per set:

	Nos. 50	*55*	*00*	*65*
Jap'd Caps	*.86*	*.93*	*.95*	*.93*
Tin'd Caps	*.91*	*.98*	*1.01*	*.96*

Bar and Corner—

Richards Mfg. Co., Bar, 60&10%; Corner.....60%

Jacks, Wagons—

Covert Mfg. Co.:
Auto Screw.....30&2%; Steel, 45%
Lane's Steel.....30&5%
Richards' Tiger Steel, No. 130...50&10%
Smith & Heinenway Co.'s.....25%

Ladder—

Richards Mfg. Co., Ladder Jacks..5%

Jointers—

Pike Mfg. Co., Saw Jointers, $7.00..40%

Knives—

Butcher, Kitchen, &c.—

Foster Bros.' Butcher, &c.....30%

Corn—

Columbian Cutlery Co., Wilcut Brand Knives and Hooks.....60%
American Fork & Hoe Co.:
Easy Cut, ₱ doz No. 10 C H...$2.10
Easy Cut, ₱ doz., No. 10 B C H.$2.20
Acme, ₱ doz.....$2.35
Dent, ₱ doz.....$2.35
Adjustable, Serrated, ₱ doz.....$1.90
Serrated, ₱ doz.....$1 85
Yankee, No. 1 C H.....$1.35
Yankee, No. 2 C H.....$1.15

Drawing—

Standard List.....80&10@—%
C. E. Jennings & Co., Nos. 45, 46 25&7½%
Jennings & Griffin, Nos. 41, 42, 60⅔&7½%
Swan's.....66⅔@70%
Watrous.....16⅔%
L. & I. J. White.....20&5@25%

Hay and Straw—

Serrated Edge, per doz. $5.00@5.50
Iwan's Sickle Edge.....₱ doz. $9.00
Iwan's Serrated.....₱ doz. $9.50

Miscellaneous—

Farriers' .....doz. $2.60@3.55
Wostenholm's .....₱ doz. $3.00@3.25

Knobs—

Base, 2¼-inch, Birch or Maple, Rubber Tip.....gro. $1.25@1.40
Door, Mineral.....doz. 65@70¢
Door, Por. Jap'd.....doz. 70@75c
Door, Por. Nickel..doz. $2.05@2.15
Bardsley's Wood Door, Shutters, &c.15%

Ladders, Store, &c.—

Lane's Store.....25%
Myers' Noiseless Store Ladders....50%
Richards Mfg. Co.:
Improved Noiseless, No. 112.....50%
Climax Shelf, No. 113.....50%
Trolley, No. 109.....50%

Ladles, Melting—

L. & G. Mfg. Co.'s list, Melting and Plumbers'.....25%
P., S. & W.....40&10%
Reading.....50&10%

Lamps,—

Hammer's M. I. Hand.....45%

Lanterns—Tubular—

Regular, No. 0....doz. $4.00@4.50
Side Lift, No. 0...doz. $4.25@4.75
Hinge Globe, No. 0. doz. $4.25@4.75
Other Styles.....40&5%

Bull's Eye Police—

3-inch .....$3.75@4.00

Latches— Thumb—

Roggin's Latches, Jap'd, with Screws .....doz. 35@40¢

Door—

Cronk & Carrier Mfg. Co., No. 101, ₱ doz. $2.00
Richards' Bull Dog, Heavy, No. 125.....50&5%
Richards' Trump, No. 127.....$1.50

Leaders, Cattle—

Small.....doz. 50¢; large, 60¢
Covert Mfg. Co.:
Cotton, 45%; Hemp, 45%; Jute, 35%; Sisal, 20%.

Lifters, Transom—

Reading, Iron, 50&5%; Bronze Metal.....33⅓%
R. & E.....10%

Lines—

Wire Clothes, Nos.	*18*	*19*	*20*
100 feet	*$2.30*	*1.95*	*1.75*
75 feet	*$1.95*	*1.65*	*1.50*

Samson Cordage Works:
Solid Braided Chalk, Nos. 0 to 3..40%
Solid Braided Masons'.....30%
Silver Lake Braided Chalk, No. 0, $6.00; No. 1, $6.50; No. 2, $7.00; No. 3, $7.50.....₱ gr. 30%
Masons' Lines, Shade Cord, &c.:
White Cotton, No. 3½, $1.50; No. 4, $2.00; No. 4½, $2.50; Colors, No. 3½, $1.75; No. 4, $2.25; No. 4½, $2.75; Linen, No. 3½, $2.50; No. 4, $3.50; No. 4½, $4.50.....30%
Tent and Awning Lines; No. 5, White Cotton, $7.50; Drab Cotton $8.50.....20%
Clothes Lines, White Cotton: 50 ft., $2.75; 60 ft., $3.25; 70 ft., $3.75; 75 ft., $4.00; 80 ft., $4.25; 90 ft., $4.75; 100 ft., $5.25.....30%
Turner & Stanton Co.:
Solid Braided Chalk, Masons' and Awning Lines.....40%
Clothes Lines, White Cotton.....40%
Shade Cord, Cotton or Linen....30%

Locks— Cabinet—

Cabinet Locks....33⅓@33⅓@5%

Door Locks, Latches, &c.—

NOTE.—Net Prices are very often made on these goods.
Reading Hardware Co.....33⅓
R. & E. Mfg. Co.....10%

Padlocks—

R. & E. Mfg. Co. Wrought Steel and Brass.....75&10%

Sash, &c.—

Ives' Patent:
Crescent.....25%
Automatic Gravity Metal Sash, ₱ gro., $149.68.....25%
Window Ventilating.....25%
Pullman Patent Ventilating Lock..25%
Reading Sash Locks, Iron.....50%
Reading Sash Locks, Bronze Metal, 33⅓%

Machines—Boring—

Com. Upr't, without Augers, $2.00@2.25
Com. Angl'r, without Augers, $2.25@2.50
Ford Auger Bit Co.....$22.00
Jennings', Nos. 1 and 4.....25&7½%
Millers' Falls.....5.75
Snell's, Upright, $2.65; Angular, $2.90
Swan's Improved.....40&10%

Corking—

Reisinger Invincible Hand Power... ₱ doz. $48.00

Forming, Bending, Etc—

Royal Forming, Bending, Crimping and Fluting, Hand Power, each, $20.00.....40%

Hoisting—

Moore's Anti-Friction Chain Hoist.30%
Moore's Hand Hoist, with Lock Brake.....20%
Moore's Cyclone High Speed Chain Hoist.....25%

Ice Cutting—

Chandler's.....12½%

Mallets—

Hickory.....45&5@50%
Lignumvitæ.....45&5@50%
Tinners' Hickory and Applewood.....doz. 45&5@50%

Mangers, Stable—

Swett Iron Works.....50%

Mats, Door—

Acme Flexible Steel.....50%
Elastic Steel (W. G. Co.), new list.50%
Everlasting Flexible Steel.....40%

Mills, Coffee, &c.—

Enterprise Mfg. Co.:
Coffee.....20@25%
Bone, Shell and Corn.....25&10%
Parker's Columbia and Victoria..33⅓%
Parker's Box and Side.....50&10%
Swift, Lane Bros. Co.....30%

Motors, Water—

Pike Mfg. Co., Tool and Knife Grinding.....33⅓%

Mowers, Lawn—

NOTE.—Net prices are generally quoted
Cheapest, 10-in., $2.00; advance 10c for each size.
Cheap, 10-in., $2.25; advance 15@20¢ for each size.
Better Grade, 10-in., $3.00; advance 25¢ for each size.

	12	*14*	*16*	*18-in.*
High Grade	*$4.50*	*4.75*	*5.00*	*5.25*

Continental, High and Low Wheel, 50&10%
Great American.....66⅔%
Great American Ball Bearing....66⅔%
Quaker City.....66⅔%
Pennsylvania, High and Low Wheel, 50&10%
Pennsylvania, Jr., Ball Bearing 50&5%
Pennsylvania Golf, 6 Knives, Low Wheel, 33⅓%; High Wheel.....45%
Pennsylvania Golf, Ball Bearing 7 Knives, High Wheel.....33⅓%
Pennsylvania Horse, 30 and 38 inch, 33⅓&5%
Pennsylvania Pony or Two Man.40&5%
Pennsylvania Grand Horse, 30 and 38 in.....33⅓%

Nails—

Wire Nails and Brads, Miscellaneous .....85&5@85&10%
Cut and Wire, See *Trade Report.*
Hungarian, Finishing, Upholsterers', &c. See *Tacks.*

Horse—

Jobbers' Special Brands, per lb. 9¢

Picture—

	1¼	*2*	*2½*	*3 in.*
Brass Hd, gro.	*.45*	*.55*	*.60*	*.70*
Por. Head, gro.	*1.10*	*1.10*	*1.10*	

Upholsters—

Brass.....30%
Plated.....30&10%

Nuts— *Blank or Tapped.*

	Off list.
Cold Punched:	
Square	*5.40¢*
Hexagon	*6.00¢*
Square, C., T. & R.	*5.80¢*
Hexagon, C., T. & R.	*6.60¢*
Hot Pressed:	Off list.
Square	*5.90¢*
Hexagon	*6.40¢*

Oakum—

Best .....lb. 6½¢
U. S. Navy.....lb. 6 ¢
Navy .....lb. 5 ¢
Plumbers' Spun Oakum..2¾@3 ¢

Oil—

Pike Mfg. Co., Stonoil.....40%

Oil Tanks—See *Tanks, Oil.*

Oilers—

Steel, Copper Plated.....75&10%
Chase or Paragon:
Brass and Copper.....50&10%
Zinc .....65&10@70%
Railroad .....60&10&10%
American Tube & Stamping Co.:
Spring Bottom Cans.....70&70&10%
Railroad Oilers, &c.....60@60&10%
Hero Fruit Jar Co.:
Spring Bottom Cans.....70@70&10%
Railroad Oilers, etc.....60@60&10%
Malleable Hammers' Improved, Nos. 11, 12 and 13, 10%; Old Pattern, Nos. 1, 2, 3, 4, 50%.
Maple City Mfg. Co.:
Spring Bottom Cans.....70@70&10%
Railroad Oilers, &c.....60@60&10%

Openers, Can—

Triumph Shear Can Openers, doz..$1.20

Egg—

Hartigan Nickel Plate, ₱ doz., $2.00; Silver Plate, $4.00.

Packing—

Asbestos Packing, Wick and Rope, any quantity.....13¢

Rubber—

(Fair quality goods.)
Sheet, C. I.....11@12¢
Sheet, C. O. S.....11@12¢
Sheet, C. B. S.....12@13¢
Sheet, Pure Gum.....40@45¢
Sheet, Red.....40@50¢
Jenkins' '96, ₱ lb, 80¢.....25%

Miscellaneous—

American Packing....lb. 7@10 ¢
Cotton Packing.....lb. 16@25 ¢
Italian Packing.....lb. 9@10¢
Jute .....lb. 4@4¼¢
Russia Packing.....lb. 9@10¢

Paint—

Dixon's Silica-Graphite, in 1 gal. pails and 5 gal. kegs, 25%; packages of larger size.....20%

Pans— Dripping—

Standard List.....75&10@80%

Refrigerator, Galva.—

Inch	*12*	*14*	*16*	*18*
Per doz	*$1.75*	*2.25*	*2.80*	*3.15*

Paper—Building Paper

Asbestos Paper, ton $37.50@$40.00
Roll Board or Building Felt, 6 to 30 lb., per 100 sq. ft...2½¢
Roll Board or Building Felt, 3-32 and ⅛ in., 45 to 60 lb. per 100 sq. ft.....3½¢
Mill Board, Sheet, 40 x 40 in., 1-32 to ½ in.....2¾¢
Per roll.
Rosin Sized Sheathing: 500 sq. ft. Light weight, 25 lbs. to roll. $1.50@1.58¢
Medium weight, 30 lbs. to roll. 58@70¢
Heavy weight, 40 lbs. to roll. 75@78¢
Black Water Proof Sheathing, 500 sq. ft., 1 ply, 65¢; 2 ply, 85¢; 3 ply, $1.10; 4 ply, $1.25.
Deafening Felt, 9, 6 and 4½ sq. ft. to lb., ton.....$31.50
Red Rope Roofing, 250 sq. ft. per roll.....$1.75

Tarred Paper—

1 ply (roll 400 sq. ft.), ton. $34.00@$38.00
2 ply, roll 108 sq. ft.....65¢
3 ply, roll 108 sq. ft.....88¢
Slater's Felt (roll 500 sq. ft.).80¢

Sand Paper and Cloth—

Flint and Emery.....50&10%
Garnet Paper and Cloth.....25%

Parers—Apple—

Goodell Co.:
Family Bay State.....℔ doz. $15.00
Improved Bay State.....℔ doz. $36.00
New Lightning.....℔ doz. $7.00
Turn Table '98.....℔ doz. $6.00
White Mountain.....℔ doz. $5.00
Bonanza Improved.....each $7.50
Dandy .....each $10.00
New Century.....each $20.00
Ranger .....each $25.00
Rapid Apple Slicer.....each $100.00
Reading Hardware Co.:
Advance .....℔ doz. $4.00
Baldwin .....℔ doz. $4.00
Reading 72.....℔ doz. $3.25
Reading 78.....℔ doz. $6.25

Orange—

Goodell Co., Success.....each $20.00

Potato—

Saratoga .....℔ doz. $7.00
White Mountain.....℔ doz. $6.00

Picks and Mattocks—

List .....75&10%
Cronk's Handled Garden Mattock, ℔ doz., $6.00.....33⅓%

Pins, Escutcheon—

Brass .....50@50&10%
Iron .....60@60&10%

Pipe, Cast Iron Soil—

Eastern Prices:
Standard, 2-6 in......68%
Extra Heavy, 2-6 in.....71%
Fittings, Standard and Heavy .....80¾% } Extra, 10 & 10&5%

Pipe, Merchant—

Carloads to Consumers:

	Steel. Blk.	Steel. Galv.	Iron. Blk.	Iron. Galv.
	%	%	%	%
⅛ and ¼ in..				
⅜ in.....				
½ in.....	See Trade Report			
¾ to 6 in....				
7 to 12 in....				

Pipe, Vitrified Sewer—

Carload lots.
Standard Pipe and Fittings, 3 to 24 in., f.o.b. factory:
First-class 85%
Second-class 87%

Pipe, Stove—

	Per 100 joints. C. L.	L. C. L.
Wheeling Corrugating Co.'s Nested:		
5 in., Uniform Color..	$5.90	$6.90
6 in., Uniform Color..	6.40	7.40
7 in., Uniform Color..	7.40	8.40

Planes and Plane Irons—

Wood Planes—

Bench, first qual......30@30&5%
Bench, second qual.....40@40&5%
Molding .....25@25&5%
Chapin-Stephens Co.:
Bench, First Quality.....30%
Bench, Second Quality.....40%
Molding and Miscellaneous.....25%
Toy and German.....30%
Union 60%

Iron Planes

Union 60%

Plane Irons—

Wood Bench Plane Irons....25%
Buck Bros.....30%
Chapin-Stephens Co.....25%
Union 50%
L. & I. J. White.....20&5@25%

Planters, Corn, Hand—

Kohler's Eclipse.....℔ doz. $7.50

Plates—

Felloe .....*lb.* 3¾@4¢
Avery Stamping Co.:
Standard Wrot. Steel Felloe Plates in 100 lb kegs, per 100 lb, ¾-in. to 1¼-in., $4.00 net; 1¼-in. to 2-in., inclusive, $3.75 net.

Steel Pipe Hook—

Never-Break .....75&10%

Pliers and Nippers

Button Pliers.....75&5@75&10%
Gas Burner, per doz., 5 in., $1.25 @$1.50; 6 in., $1.45, $1.50.
Gas pipe.. 7 in. $2.00; 8 in. $2.25; 10 in. $2.75; 12-in. $3.50
Acme Nippers.....50%
Cronk & Carrier Mfg. Co.:
American Button.....80%
Improved Button.....75&10%
Cronk's 60%
No. 80 Linemen's.....50%
Stub's Pattern.....45%
Combination and others.....33⅓%
Elmore Tool Mfg. Co.:
Gas Pliers.....70%
Wire and Cutting Pliers.....75%
Heller's Farriers' Nippers, Pincers and Tools.....40@40&10%
P., S. & W. Tinners' Cutting Nippers 20%
Utica Drop Forge & Tool Co.:
Pliers and Nippers, all kinds....40%

Plumbs and Levels—

Chapin-Stephens Co.:
Plumbs and Levels.....30@30&10%
Chapin's Imp. Brass Cor..40@40&10%
Pocket Levels.....30@30&10%
Extension Sights.....30@30&10%
Machinists' Levels.....40@40&10%
Disston & Sons:
Shafting Levels .....60&10%
Pocket Levels.....60&10%
Plumbs and Levels.....60&10%
Track Level and Gauge.....60&10%
Woods' Extension.....33⅓%

Points, Glaziers'—

Bulk and 1 lb. papers....lb. 9 ¢
½-lb. papers.....lb. 9½¢
¼-lb. papers.....lb. 10 ¢

Police Goods—

Manufacturers' Lists..25@25&5%

Polish—Metal, Etc—

Ladd Co.:
Putzade Liquid, ℔ gro., ½ pts., $12.00; 1 pts., $20.00; 1 qts., $40.00; ℔ doz., ½ gals., $6.35; 1 gals., $12.00.
Prestoline Liquid, No. 1 (½ pt.), ℔ doz., $3.00; No. 2 (1 qu.), $9.00..40%
Prestoline Paste.....40%
George William Hoffman:
U. S. Metal Polish Paste, 3 oz. boxes, ℔ doz. 50¢; ℔ gro. $4.50; ½ lb boxes, ℔ doz. $1.25; 1 lb boxes, ℔ doz. $2.25.
U. S. Liquid, 8 oz. cans, ℔ doz., $1.25.
Barkeepers' Friend Metal Polish, ℔ doz., $1.75.

Stove—

Black Eagle Benzine Paste, 5 lb cans, ℔ lb 10¢
Black Eagle, Liquid, ½ pt. cans.. ℔ doz. 75¢
Black Jack Paste, ¾ lb cans, ℔ gr. $9.00
Black Kid Paste, 5 lb can...each, $0.65
Ladd's Black Beauty Liquid, per 100 tins.....$6.75
Joseph Dixon, ℔ gr. $5.75.....10%
Dixon's Plumbago.....℔ lb 8¢
Fireside .....℔ gr. $2.50
Gem, ℔ gr. $4.50.....10%
Japanese .....℔ gr. $3.50
Jet Black.....℔ gr. $3.50
Peerless Iron Enamel, 10 oz. cans.. ℔ doz. $1.50

Window Polish—

Benj. P. Forbes:
Glasbright, 1 lb cans, each.. .....75¢
Glasbright, Factory, 10 lb pails, ℔ lb.....25¢

Poppers, Corn—

1 qt. Square..doz. $0.80; gro. $8.75
1 qt. Round..doz. $0.90; gro. $10.00
1½ qt. Square. doz. $1.20; gro. $12.00
2 qt. Square..doz. $1.50; gro. $15.00

Pots, Glue—

Enameled 40%
Tinned .....30&10%

Powder—

Black Sporting:
Kegs (25 lb.)..$5.00@5.50
Half Kegs (12½ lb.), $2.75@3.00
Quarter Kegs (6¼ lb.), $1.50@1.65
Canisters, pounds... .25
Canisters, ½ pounds. .15
Canisters, ¼ pounds. .12
} Discount to the trade, 10%.
NOTE.—Prices vary according to territory.

Presses—

Enterprise Mfg. Co., Fruit, Wine and Jelly.....20@25%
Lard Presses and Sausage Stuffers .....25@25&7½%

Seal Presses—

Morrill's No. 1, ℔ doz., $20.00.....50%
Morrill's Pocket, $20.00.....50%

Pruning Hooks and Shears

See *Shears.*

Pullers, Nail, Etc.—

Elmore Tool Mfg. Co.:
Drop Forged Tack Pullers.....10%
Nail Pullers.....40%
Miller's Falls, No. 3, ℔ doz., $12.00.. 33⅓&10%
Morrill's No. 1, Nail Puller, ℔ doz. $20.00 .....50%
Pearson Spike Puller, each, $15.00..50%
The Scranton Co. Case Lots:
No. 2B (large).....$5.50
No. 3B (small).....$5.00

Pulleys, Single Wheel—

Inch	1½	1¾	2	3
Awning or Tackle, doz.	$0.30	.45	.60	1.05
Hay Fork, Swivel or Solid Eye, doz., ¼ in., $1.25; 5 in., $1.55				
Inch	2	2¼	2½	
Hot House, doz...	$0.65	.85	1.20	
Inch	1¼	1½	1¾	2
Screw, doz....	$0.16	.19	.23	.30
Inch	1¾	2	2¼	2½
Side, doz.....	$0.25	.40	.55	.60
Inch	1½	1¾	2	2½

Sash Pulleys—

Common Frame; Square or Round End, per doz., 1¾ and 2 in. .....*17@20¢*
Auger Mortise, no Face Plate, per doz., 1¾ and 2 in.. .20@21¢
Acme, No. 35..1¾ in., 19¢; 2 in., 20½¢
American Pulley Co.:
Wrought Steel American Plain Axle .....50&10%
Wrought Steel, Eagle, ℔ doz., 1¾ in., 17¢; 2 in., 20¢; 2¼ in., ...27¢
Top Notch, Electrically Welded, Nos. 3 and 4, ℔ doz.....19¢
Common Sense.....℔ doz. 20¢
Merit, ℔ doz., 2¼ in.....37¢
Fox-All-Steel, Nos. 3 and 7, 2 in.... ℔ doz. 50%
Grand Rapids All Steel Noiseless. 50%
Niagara, No. 25, 1¾ in., 19¢; 2 in. .....20½¢
No. 26 Troy..1¾ in., 14½¢; 2 in., 16½¢
Star, No. 26....1¾ in., 19¢; 2 in., 20½¢
Tackle Blocks—See Blocks.

Pumps—

Cistern 60%
Pitcher Spout.....75&10&5@80
Wood Pumps, Tubing, &c....50%
Barnes Mfg. Co.:
Dbl. Acting (low list).....50%
Pitcher Spout.....80%
Contractors' Rubber Diaphragm, No. 2, B. & L. Block Co.....$16.00
Daisy Spray Pump.....℔ doz. $6.50
Goulds Mfg. Co.:
Double-Acting Thresher Tank.. $5.00
Diaphragm No. 3, Side Suction.$14.50
Empire, Advance, Seneca, D. A, Shallow and Deep Well (low list) 50%
Spraying and Whitewashing.....$2.45
F. E. Myers & Bros.:
Pumps (low list), Power Pumps, Spray Pumps.....50%

Pump Attachments—

Chicago Hdw. & Fdy. Pump Spout Attachments, each.....$0.27

Pump Leathers—

Plunger and Valve Leathers—Per gro.:

No.	1	2	3	4	
	$5.00	6.00	7.00	8.00	
Cup Leathers—Per 100:					
Inch....	2½	3	3½	4	} 50@30&5%
	$5.00	7.00	9.00	12.00	

Punches—

Saddlers' or Drive, good, doz. .50@75¢
Spring, single tube, good quality $1.75
Revolving (4 tubes)....doz. $3.50
Bemis & Call Co.'s Cast St'l Drive.50%
Elmore Tool Mfg. Co.:
Machinists' Center.....40%
Tinners': Solid, 50%; Prick.....50%
Morrill's Nos. 1AA, 1A, 1B, 1C, 1D, $15.00.....50%
Hercules, 1 die, each $5.00.....50%
Niagara Hollow Punches.....40%
Niagara Solid Punches.....55%
Tinners' Hollow, P., S. & W. Co..25%
Tinners' Solid, P., S. & W. Co., doz., $1.44.....40&10%

Rail—Barn Door, &c.—

Sliding Door, Painted Iron, 2½@2¾¢
Sliding Door, Wrought Brass, 1⅛ in., lb., 36¢ 50%
Cronk's:
Double Braced Steel Rail..℔ ft. 2¾¢
O. N. T. Rail.....2½¢
Griffin's:
xxx, ℔ 100 ft., 1 x 3-16 in., $3.25; 1¼ x 3-16 in., $3.75.
Hinged Hanger, ℔ 100 ft., 1 x 3-16 in., $3.50; 1¼ x 3-16 in., $4.00.
Lane's:
Hinged Track, ℔ 100 ft.....$3.45
O. N. T., ℔ 100 ft., 1 in., $3.12½; 1¼ in., $3.45; 1½ in., $4.00.
Standard, 1¼ in.....℔ 100 ft. $4.00
Lawrence Bros.:
1 x 3-16 in., ℔ 100 ft., $7.50; 1¼ x 3-16 in., $8.75.....55&7½%
Trolley, No. 301, ℔ ft.....9¢
McKinney's:
Hinged Hanger Track, ℔ ft., 11¢ .....60&5%
1 x 3-16 Track.....55&7½%
Myers' Stayon Track.....60&5%
Richards Mfg. Co.:
Common, 1 x 3-16 in., $3.00; 1⅛ x 3-16, $3.25; 1¼ x 3-16, $3.50.
Special Hinged Hanger Rail..60&10%
Lag Screw Rail, No. 65.....50%
Gauge Trolley Track, ℔ ft., No. 31, 9¢; No. 32, 14¢; No. 33, 20¢, No. 50.....60&10%
Nos. 61, $3.00; 62, $3.25; 63, $3.50; 64, $4.00; 45, $3.25; 46, $3.50; 49, No. 1, $3.25; 49, No. 2, $3.50.

Rakes—

American Fork & Hoe Co.:
Lawn, ℔ doz., No. 24, $2.50; No. 20 .....$2.25
Cronk's:
Steel Garden: Champion, ℔ doz., 12-tooth, $3.75; 14-tooth, $4.00; 16-tooth, $4.25; Ideal, ℔ doz., 12-tooth, $3.00; 14-tooth, $3.30; 16-tooth, $3.60.
Victor, 12-tooth, $2.25; 14-tooth, $2.50; 16-tooth, $2.75.
Queen City Lawn, ℔ doz., 20 teeth, $2.35; 24, $2.50.....net
Anticlog Lawn, ℔ doz.....$3.50
Malleable Garden.....70&10%
Ideal Steel Garden, ℔ doz., 12 teeth, $15.00; 14, $16.00; 16, $18.00.....80%
Kohler's:
Jumbo Lawn, 36-tooth....℔ doz. $5.00
Lawn Queen, 20-tooth....℔ doz. $2.65
Lawn Queen, 24-tooth....℔ doz. $2.75
Paragon, 20-tooth.....℔ doz. $2.40
Paragon, 24-tooth.....℔ doz. $2.50
Steel Garden, 14-tooth....℔ doz. $2.40
Malleable Garden, 14-tooth, ℔ doz. $1.75@2.00

Rasps, Horse—

Disston's 75%
Heller Bros.'.....70&5@70&10&5%
Liveright Bros.' Gold Medal.....70%
McCaffrey's American Standard ..... 60&10&5%
New Nicholson.....70&10@75%
See also Files.

Razors—

W. H. Compton Shear Co.....30%

Reels, Fishing—

Hendryx:
M 6, Q 6, A 6, B 6, M 9¼, M 16, Q 16, A 16, B 16, 4008, Rubber, Populo., Nickeled Populo.....20%
Aluminum, German Silv., Bronze.25%
1240 N, 124 N.....20%
3004 N, 06 N, 6 RM, G 9.....25%
4 N, 6 PN, 24 N, 26 PN.....20%
2904 P., 33⅓%; 2904 PN., 33⅓%; 0924 N., 33⅓%; 92081 N., 33⅓%; 002904 PN., 33⅓%; 802 N., 33⅓%; 986 PN, 2904 N, 974 PN.....25%
5009 PN, 5009 N.....20%
Competitor, 102 P, 102 PN, 202 P, 202 PN, 102 PR, 202 PR.....20%
304 P, 304 PN, 00304 P, 00304 PN.33⅓%

Registers—*List July 1, 1903.*

Japanned, Electroplated and Bronzed 70%
*White Porcelain Enamel..*50&10%
*Solid Brass or Bronze Metal.*40%

Revolvers—

Single Action.....*95¢@$1.00*
Double Action, except 44 cal..*$2.00*
Double Action, 44 caliber...*$2.00*
Automatic *$4.00*
Hammerless *$4.50*

Riddles, Hardware Grade

16 in.....per doz. $2.50@$2.75
17 in.....per doz. $2.75@$3.00
18 in.....per doz. $3.00@$3.25

Rings and Ringers—

Bull Rings—

	⅜	2½	3 inch.
Steel	$0.70	0.75	0.80 doz.
Copper	$1.10	1.25	1.35 doz.

Hog Rings and Ringers—

Hill's Rings, per gro. boxes, $4.60@$4.75; per doz. boxes 40@45¢
Hill's Ringers, Gray Iron, doz., 55@65¢
Hill's Ringers, Malleable Iron, doz. 85@95¢
Blair's Rings..per gro.$5.50@$6.00
Blair's Ringers..per doz. 65@70¢

Rivets—

Copper Rivets and Burrs, 50@50&10%
Tinners' and Miscellaneous Rivets .....80&5%

Bifurcated and Tubular—

Assorted in Pasteboard Boxes.
Bifurcated, per dozen boxes. 50 count, 40@45¢; 100 count, 50@ 63¢.
Tubular, per doz. boxes, 50 count, 60@68¢; 100 count, $1.12@$1.26.

Rollers—

Cronk's Stay, No. 50.....$1.00
Cronk's Brinkerhoff No. 55, $0.60; No. 56, $0.75; No. 60.....$0.75
Lane's Stay.....40%
Richards' Stay:
Handy Adj. and Reversible No. 53.75¢
O. K. Adj. and Reversible No. 58.50¢
Lag Screw, Nos. 55 and 57.....50%
Underwriters', Nos. 59, 60.....50%
Favorite, No. 54.....60%

Rope—

Manila, 7-16 in. diam. and larger: Highest Grade.....lb. 8¼@8½¢
Lower Grades.
Sisal, 7-16 in. diam. and larger: Highest Grade.....lb. 7½@7¾¢
Commercial Grade.....lb. 6½¢
Sisal, Hay, Hide and Bale Ropes, Medium and Coarse: Pure .....*lb.* 7¾@8¢

Sisal, Tarred, Medium Lath Yarn:
Pure ..... *lb.* 6¾@7¢
Cotton Rope:
Best, ¼-in. and larger. 16½@20¢
Medium, ¼-in. and larger. 15@16¢
Common, ¼-in. and larger. 7½¢
In coils, ½¢ advance.
Jute Rope:
Rope, No. 1, ¼-in. and up. *lb.* ..... 5@5½¢

Wire Rope—

Galvanized ..... 47½&2½%
Plain ..... 55&2½%

Ropes, Hammock—

Covert Mfg. Co.:
Jute, 35%; Sisal 20%

Rules

Boxwood ..... 60&5%
Ivory ..... 25&5%
Chapin-Stephens Co.:
Boxwood 60%
Flexifold 40%
Ivory ..... 25@25&10%
Miscellaneous ..... 50@50&10%
Stephens' Combination 55%
Stationers' ..... 50@50&10%
Keuffel & Esser Co.:
Folding, Wood ..... 35&10%
Folding, Steel ..... 33⅓&10%
Lufkin's Steel ..... 50&10%
Lufkin's Lumber ..... 50&10%
Upson Nut Co.:
Upson Nut Co., Boxwood ..... 60&5%

Saws—

Atkins':
Circular 45%
Band ..... 50@50&10%
Butcher Saws 50%
Cross Cuts 35%
One-Man Cross Cut 40%
Narrow Cross Cut 50%
Hand, Rip and Panel ..... 35&5%
Miter Box and Compass 40%
Mulay, Mill and Drag 45%
Wood Saws ..... 40&10%
Chapin-Stephens Co.:
Turning Saws and Frames. 30@30&10%
Disston's:
Circular, Solid and Ins'ted Tooth. 50%
Band, 2 to 18 in. wide 60%
Band, ⅛ to 1¾ 60%
Crosscuts 45%
Narrow Crosscuts 50%
Mulay, Mill and Drag 40%
Framed Woodsaws 25%
Woodsaw Blades 25%
Woodsaw Rods, Tinned 15%
Hand Saws, Nos. 12, 99, 9, 16, d100, D8, 120, 76, 77, 8 ..... 25%
Hand Saws, Nos. 7, 107, 107½, 3, 1, 0, 00, Combination 30%
Compass, Key Hole, &c 25%
Hand Ice Saws 45%
Butcher Saws and Blades 30%
C. E. Jennings & Co.'s:
Back Saws 16⅔%
Butcher Saws ..... 25&7½%
Compass and Key Hole Saws ..... 33⅓&7½%
Framed Wood Saws ..... 25&7½%
Hand Saws 12½%
Wood Saw Blades ..... 33⅓&7½%
Millers Falls:
Butcher Saws ..... 15&10%
Star Saw Blades ..... 15&10%
Massachusetts Saw Works:
Victor Kitchen Saws ..... 40&10&50%
Butcher Saws Blades ..... 35@40%
Peace & Richardson's Hand Saws. 30%
Simonds':
Circular Saws 45%
Crescent Ground Cross Cut Saws. 30%
One-Man Cross Cuts ..... 40&10%
Gang Mill, Mulay and Drag Saws. 40%
Band Saws 50%
Back Saws ..... 25@25&7½%
Butcher Saws ..... 35@35&7½%
Hand Saws ..... 25@25&7½%
Hand Saws, Bay State Brand 45%
Compass, Key Hole, &c. 25@25&7½%
Wood Saws ..... 40&7½%
Wheeler, Madden & Clemson Mfg. Co.'s Cross Cut Saws 50%

Hack Saw Blades and Frames—

Atkins' Hack Saw Blades A A A. 25%
Disston's:
Concave Blades 25%
Chromol Blades 35%
Hack Saw Frames 30%
Simonds, 35%; Bay State, 40%; Culley 35%
C. E. Jennings & Co.'s:
Hack Saw Frames, Nos. 175, 180 ..... 40&7½%
Hack Saws, Nos. 175, 180, complete, 40&7½%
Goodell's Hack Saw Blades ..... 40&10%
Griffin's Hack Saw Frames. 35&5&10%
Griffin's Hack Saw Blades ..... 35&5&10%
Griffin Co. Hack Saw Blades 50%
Star Hack Saws and Blades ..... 15&10%
Sterling Hack Saw Blades. 30&10&5%
Sterling Hack Saw Frames. 30&10&10%
Sterling Power Hack Saw Machines, each, No. 1, $25.00; No. 2, $30.00. 10%
Victor Hack Saw Blades 20%
Victor Hack Saw Frames 40%
Victor Hack Saw Machines, each. $75.00

Scroll—

Barnes, No. 7, $15 ..... 25%
Barnes' Scroll Saw Blades 40%
Barnes' Velocipede Power Scroll Saw, without boring attachment, $18; with boring attachment, $20 ..... 20%
Loster, complete, $10.00 ..... 15&10%
Rogers, complete, $3.50 and $4.00 ..... 15&10%

Scales—

Union Platform, Plain. $2.10@2.20
Union Platform, Stpd. $2.20@2.30
Chatillon's:
Eureka 25%
Favorite 40%
Grocers' Trip Scales 50%
Reading Hardware Co. ..... 50&5%
The Standard Portables 40%
The Standard R. R. and Wag- 30%

Scrapers—

Chapin-Stephens Co., Box. 30@30&10%
Richards Mfg. Co., Foot 60%

Screws—Bench and Hand

Bench, Iron, doz., 1 in., $2.50@2.75; 1⅛, $3.00@3.25; 1¼, $3.50@3.75
Bench, Wood ..... 20@20&10%
Hand, Wood ..... 70&10@70&10&10%
Chapin-Stephens Co., Hand ..... 70@70&10&2½%

Coach, Lag and Hand Rail—

Lag, Cone Point ..... 75&10&10%
Coach, Gimlet Point ..... 75&10&5%
Hand Rail ..... 70&10@75%

Jack Screws—

Standard List ..... 70&10@75%
Millers Falls ..... 50&10&10%
Swett Iron Works ..... 70@75%

Machine—

Cut Tread, Iron, Brass or Bronze:
Flat Head or Round Head, 50@50&10%
Fillister Head ..... 40@40&10%
Rolled Thread, F. H. or R. H., Iron ..... 75&10%
F. H. or R. H., Brass, Nos. 8 to 14 ..... 65&10%

Set and Cap—

Set (Iron) ..... 75&10&7½%
Set (Steel), net advance over Iron 25%
Sq. Hd. Cap ..... 70&10&7½%
Hex. Hd. Cap ..... 70&10&7½%
Rd. Hd. Cap ..... 50&7½%
Fillister Hd. Cap ..... 60&7½%

Wood—

List July 23, 1903.

	Per doz.
Flat Head, Iron	87½&5%
Round Head, Iron	85&5%
Flat Head, Brass	80&5%
Round Head, Brass	77½&5%
Flat Head, Bronze	75&5%
Round Head, Bronze	72½&5%
Drive Screws	87½&5%

Scythes—

	Per doz.
Plain Grass, Cutting Edge Polished	$6.25@$6.50
Clipper, Bronzed Web	$6.50@$6.75
Solid Steel, Web and Backs Polished	$7.00@$7.25
Bush, Weed and Bramble, Painted	$6.50@$6.75
Grain, Painted, Cutting Edge Polished	$8.25@$8.50
Clipper Grain, Bronze Web	$8.50@$8.75

Seeders, Raisin—

Enterprise ..... 25@30%

Sets— Awl and Tool—

Fray's Hollow Tool Handles, Nos. 1, $12; 2, $16; 3, $12 ..... 50%
Millers Falls Adj. Tool Handles, No. 1, $12; No. 4, $12; No. 5, $18. 20&10%

Garden Tool Sets—

American Fork & Hoe Co.:
Rake, Shovel and Hoe, ℔ doz. sets, No. 3 P F $3.75

Sets, Nail—

Octagon ..... *gro.* $3.10@3.75
Buck Bros. 27½%
Elmore Tool Mfg. Co. 30%
Mayhew's ..... ℔ gro. $9.00
Snell's Corrugated, Cup Pt. ..... 40&10%
Snell's Knurled, Cup Pt. ..... 40&10%
Victor Knurled, Cup Pt. ..... ℔ gro. $7.50

Rivet—

Regular list ..... 75@75&10%

Saw—

Atkin's:
Criterion 40%
Adjustable 40%
Disston's Star, Monarch and Triumph 30%
Giant Royal Cross Cut. ..... ℔ doz. $6.00
Morrill's No. 1 ..... $15.00
Nos. 3 and 4, Cross Cut $20.60
No. 5, Mill $30.00
Nos. 10, 11, 95 ..... $15.60
No. 1 Old Style $10.00
Special $16.25
Royal, Hand ..... ℔ doz. $3.50
Seymour Smith & Son's 65%
Taintor Positive ..... ℔ doz. $6.75

Sharpeners, Knife—

Pike Mfg. Co.:
Fast Cut Pocket Knife Hones, ℔ doz. $1.50
Mounted Kitchen Sand Stone, ℔ doz. $1.50
Natural Grit Carving Knife Hones, ℔ doz. $3.00
Quick Cut Emery Carving Knife Hones, ℔ doz. $1.50
Quick Edge Pocket Knife Hones, ℔ doz. $2.50

Lawn Mower—

Pike Mfg. Co., 12, 14, 16, 18 and 20 in., doz., $6.00 ..... 33⅓%

Shavers, Beef—

Enterprise Mfg. Co. ..... 25@30%

Shaves, Spoke—

Iron ..... *doz.* $1.25
Wood ..... *doz.* $2.00
Chapin-Stephens Co. ..... 30@30&10%
Millers Falls Co., ℔ doz., $9.00. 15&10%
Seymour Smith & Son's 30%

Shears—

	7	8	9 in.
Cast Iron			
Best	$16.00	18.00	20.00 gro.
Good	$13.00	15.00	17.00 gro.
Cheap	$5.00	6.00	7.00 gro.

Straight Trimmers, &c.:
Best quality Jap ..... 70&10&5%
Best Quality Nickel ..... 60&10&5%
Tailors' Shears ..... 40@40&10%
Acme Cast Shears 40%
Columbian Cutlery Co.:
Sheep, 1900 list ..... 30&10&5%
Grass ..... 50&10%
Horse or Mule ..... 50&10%
W. H. Compton Shear Co.:
Japan Handles, Nickel Blades, 60&10&5%
Full Nickel ..... 50&10&5%
Tailors' 30%
J. Wiss & Sons Co.:
Best Quality Jap'd ..... 60&10%
Best Quality Nickeled ..... 50&10%
Tailors' 25%

Tinners' Snips—

Steel Blades ..... 20&5@20&10%
Steel Laid Blades ..... 50&10%
Acme Cast Snips 40%
W. H. Compton Shear Co., Forged Steel Handles 35%
Jennings & Griffin Mfg. Co.'s 6½ to 10 in. ..... 33⅓&7½%
Niagara Snips 40%
P. S. & W. Forged Handles 25%
Forged Handles, Steel Blades, Samson ..... 40@40&5%
Triumph Stove Pipe, doz. $6.00
J. Wiss & Sons Co.:
Wiss Forged Steel 25%

Pruning Shears—

Columbian Cutlery Co.:
Hedge, Wilcut Brand ..... 60&10%
Lawn and Border, Wilcut Brand, 60&10%
W. H. Compton Shear Co., Dropped Forged Steel 35%
Cronk's Hand Shears 33⅓%
Cronk's Wood Handle Shears. 33⅓%
Disston's Combined Pruning Hook and Saw, ℔ doz, $18.00 ..... 25%
Disston's Pruning Hook only, ℔ doz., $12.00 ..... 25%
J. T. Henry Mfg. Co.:
Pruning Shears, all grades 40%
P. S. & W. Co. 40%
Seymour Smith & Son's:
Hand Shears 70%
Standard Tree Pruners ..... 75&10%
Wood Handle Pruning Shears. 40%

Sheaves— Sliding Door—

Reading 40%
R. & E. list 15%

Sliding Shutter—

Reading list 40%
R. & E. list 15%

Shells—Shells, Empty—

Brass Shells, Empty:
Climax, 10 and 12 gauge ..... 60&5%
Club, Rival, 65&5%; First Quality, 60&5%
Paper Shells, Empty:
New Rapid, 10, 12, 16 and 20 gauge, 25&10%
Climax, 10 and 12 gauge; Arrow, 10, 12, 16 and 20 gauge; Leader grade ..... 25&5%
New Club, 10 and 12 gauge, Rival Grade 25%
New Climax, Defiance, 10, 12, 14, 16 and 20 gauge; Climax, 14, 16 and 20 gauge 20%
Nitro Club, 10, 12, 16 and 20 gauge; New Club, 14, 16 and 20 gauge; Repeater Grade 20%

Shells, Loaded—

Loaded with Black Powder 40%
Loaded with Smokeless Powder, medium grade ..... 40&5%
Loaded with Smokeless Powder, high grade ..... 40&10&10%
Union Metallic Cartridge Co.:
New Club, Black Powders 40%
Nitro Club, Smokeless Powders. 40&5%
Arrow, Smokeless Powders. 40&10&10%
Winchester:
Smokeless Repeater Grade ..... 40&5%
Smokeless Leader Grade ..... 40&10&10%
Black Powder 40%

Shingles, Metal— Per Sq.

Wheeling Corrugating Co.:
Dixie, 14 x 20 in. $4.05
Dixie, 10 x 14 in. 4.25
Dixie, 7 x 10 in. 5.25
Dixie, 10 x 14 in. 5.45
Dixie, 7 x 10 in. 6.70

Shoes, Horse, Mule, &c.—

F.o.b. Pittsburgh:
Iron ..... *per keg.* $4.10
Steel ..... *per keg.* $3.85
Burden's, all sizes ..... ℔ keg $3.90

Shot—

	25-lb. bag.
Drop, up to B	$1.60
Drop, B and larger	1.85
Buck	1.85
Chilled	1.85
Dust	2.30

Shovels and Spades—

Association List ..... 40&7½@40&10%
Avery Stamping Co. 40%

Snow Shovels—

Long Handle ..... $2.50@$2.75
Wood and Mall, D Handle, $2.65@$2.90

Sieves and Sifters—

Hunter's Imitation, gro. $9.50
Hunter's Genuine, per gro. $12.00

Sieves, Seamless Metallic

	Per dozen.			
Mesh	14	16	18	20
Iron Wire	$1.05	1.05	1.10	1.20
Tinned Wire	$1.15	1.15	1.20	1.30

Sieves, Wooden Rim—

Nested, 10, 11 and 12 Inch.
Mesh 18, Nested ..... *doz.* $0.90@0.95
Mesh 20, Nested ..... *doz.* $1.00@1.05
Mesh 24, Nested ..... *doz.* $1.30@1.40

Sinks, Cast Iron—

Painted, Standard list:
12 x 12 to 22 x 36 in. 60%
20 x 24 to 24 x 50 in. 50%
24 x 60 to 24 x 120 in. 30%
Barnes' low list, all sizes up to 20 x 40, 60%; larger sizes 55%
NOTE.—There is not entire uniformity in lists used by jobbers.

Steel—

Steel Sinks, L. & G. list 60%

Skeins, Wagon—

Cast Iron ..... 70@70&10%
Steel ..... 35@40%

Slates, School—

Factory Shipments.
"D" Slates ..... 50@50&10%
Eureka, Unexcelled Noiseless ..... 60&7 tens.
Victor A, Noiseless. 60&4 tens &5%

Sleds—

Little Giant Folding, ℔ doz. $12.00

Snaps, Harness—

German ..... 40@40&10%
Covert Mfg. Co.:
Derby, 25%; Yankee, 30&2%; Yankee Roller, 30&2%
High Grade, 40%; Trojan 40%
Jockey 25%

Snaths—

Grass Scythe ..... 50@50&5%

Spoons and Forks—

Silver Plated—

Good Quality ..... 50&10@60&5%
Cheap ..... 60@60&10%
International Silver Co:
1847 Rogers Bros. ..... 10&10%
Rogers & Bro., William Rogers' Eagle Brand ..... 50&10%
Anchor, Rogers Brand 60%
Wm. Rogers & Son ..... 60&10%

Miscellaneous

German Silver ..... 60@60&5%

Tinned Iron—

Teas ..... *per gro.* 50@55¢
Tables ..... *per gro.* $0.90@$1.00

Springs— Door—

Bardsley's Spring and Check 40%
Chicago (Coil) ..... 10&10%
Pullman Door (Coil), ℔ gro. $10.00
Pullman Gate 10%
Reliance (Coil) ..... 40&10%

Carriage, Wagon, &c.—

	Per 100 lb.
1¼ in. and Wider:	
Black	$4.75@$5.00
Half Bright	$4.75@$5.00
Bright	$5.25@$5.50

Painted Seat Springs:
1½ x 2 x 26. . . . per pair. 45@47¢
1½ x 3 x 28. . . . per pair. 68@71¢

Sprinklers, Lawn—

Enterprise ..... 25@30%
Hero Fruit Jar Co., ℔ doz. $4.50
Philadelphia No. 1, ℔ doz., $12; No. 2, $15; No. 3, $20 ..... 30%

Squares—

Nickel plated. Steel and Iron. } *List Jan. 5, 1900,* 80@80&5%
Rosewood Hdl. Try Square and T-Bevels ..... 60&10&10@70%
Iron Hdl. Try Squares and T-Bevels ..... 40&10@40&10&10%
Disston's Try Squares and Bevels, 60&10%

Squeezers, Lemon

Wood, Porcelain Lined:
Cheap ..... *doz.* $1.00
Good Grade ..... *doz.* $1.25
Tinned Iron ..... *doz.* $0.75@1.00
Iron, Porcelain Lined ..... *doz.* $1.75
Victor, ℔ gro. $9.00

Staples—

Barbed Blind ..... 85&5@85&10%
Electricians' ..... 80&10&10@85%
Fence Staples, Polished, $1.80:
Galvanized $2.10
Poultry Netting Staples ..... *per lb.* 3¼@3½¢

Steels, Butchers'—

Dick's 30%
Foster Bros. 30%

Steelyards— ..... 30@30&10%

Stocks and Dies—

Blacksmiths' .....50@50&10%
Curtis Rer'ble Ratchet Die Stock..25%
Derby Screw Plates.....25%
Green River.....25%
Lightning Screw Plate.....25%
Little Giant.....25%
Reece's New Screw Plate.....25%

Stoners, Cherry—

Enterprise .....25@30%

Stones, Axe—

Pike Mfg. Co., Axe Stones (all kinds) 33⅓%

Glass Cutters' Stones—

Pike Mfg. Co., Glass Cutters' Stones and Supplies.....40%

Stones, Oil, &c.—

Pike Mfg. Co., 1907 list: ₱ lb
Arkansas St, No. 1, 3 to 5½ in.$2.80
Arkansas St, No. 1, 5½ to 8 in.$3.50
Arkansas Slips No. 1.....$1.00
Lily White Washita, 4 to 8 in.60¢
Rosy Red Washita, 4 to 8 in..60¢
Washita St., Extra, 4 to 8 in..50¢
Washita St., No. 1, 4 to 8 in..40¢
Washita St., No. 2, 4 to 8 in..25¢
Lily White Slips.....90¢
Rosy Red Slips.....90¢
Washita Slips, Extra.....80¢
Washita Slips, No. 1.....70¢
Washita Slips, No. 2.....40¢
India Oil Stones (entire list)...33⅓%
Quickcut Emery and Corundum Oil Stone, Double Grit.....60%
Quickcut Emery and Corundum Axe Stone, Double Grit.....33⅓%
Quickcut Emery Rubbing Bricks..40%
Hindostan No. 1, R'g'lar. ₱ lb 8¢
Hindostan No. 1, Small. ₱ lb 10¢
Turkey Oil Stones, Extra, 5 to 8 in.....₱ lb 80¢
Queer Creek Stones, 4 to 8 in.20¢
Queer Creek Slips.....40¢
Sand Stone.....6¢

Scythe Stones—

Pike Mfg. Co., 1907 list:
Black Diamond S. S..₱ gro. $12.00
Lamoille S. S.....₱ gro. $11.00
White Mountain S. S.₱ gro. $9.50
Green Mountain S. S.₱ gro. $7.00
Extra Indian Pond S.S.₱ gro. $8.00
No. 1 Indian Pond S.S.₱ gro. $7.50
No. 2 Indian Pond S.S.₱ gro. $5.00
Leader Red End S. S.₱ gro. $5.00
Quick Cut Emery....₱ gro. $10.00
Pure Corundum.....₱ gro. $18.00
Crescent $7.00
Emery Scythe Rifles, 2 Coat. $8.80
Emery Scythe Rifles, 3 Coat.$11.00
Emery Scythe Rifles, 4 Coat.$13.20
Balance of 1907 list 33⅓%
Lectro (Artificial), ₱ gro., $12.00 $12.00 .....33⅓%
Lightning (Artificial), ₱ gro., $18.00 .....33⅓%

Stoppers, Bottle—

Victor Bottle Stoppers.....₱ gro. $9.00

Stops—Bench—

Millers Falls.....15&10%
Morrill's, ₱ doz., No. 1, $10.00....50%
Morrill's, No. 2, $12.50.....50%
Seymour Smith & Son's.....60%

Door—

Chapin-Stephens Co.....50&50&10%

Plane—

Chapin-Stevens Co.....20%

Straps—Box—

Acme Embossed, case lots..20&10&10%
Cary's Universal, case lots...20&10&10%

Stroppers, Razor—

Pullman Safety Razor Blade, doz.$8.50

Stuffers, Sausage—

Enterprise Mfg. Co., Stuffers and Lard Presses.....25@25&7½%
P., S. & W. Co.....40&10&5%

Tacks, Finishing Nails, &c.

American Carpet Tacks.90&25@—%
American Cut Tacks..90&25@—%
Swedes' Cut Tacks.L..90&30@—%
Swedes' Upholsterers'..90&35@—%
Gimp Tacks.....90&35@—%
Lace Tacks.....90&35@—%
Trimmers' Tacks.....90&30@—%
Looking Glass Tacks.....65@—%
Bill Posters' and Railroad Tacks, 90&10@—%
Hungarian Nails.....80@—%
Finishing Nails.....70@—%
Trunk and Clout Nails.75&5@—%
NOTE.—The above prices are for Straight Weights
See also Nails, Wire.

Double Pointed—

Double Pointed Tacks, 90&6 tens@—%

Tapes, Measuring—

American Assc' Skin....50@—%
Patent Leather.....25@30&5%
Steel .....33⅓&5%
Chesterman's .....25@25&5%
Keuffel & Esser Co.:
Favorite, Ass Skin.....40&10@50%
Favorite, Duck and Leather..... 25&5@25&10%
Metallic and Steel, lower list, 35@35&5%; Pocket, 35@35&5%.

Lufkins:
Asses' Skin.....40&10@50%
Metallic .....30@30&5%
Patent Bend, Leather...25&5@25&10%
Pocket .....40@40&5%
Steel .....33⅓@35%
Wiebusch & Hilger:
Chesterman's Metallic, No. 34L, etc. 25%
Chesterman's Steel, No. 1038L, etc. 35%

Teeth, Harrow—

Steel Harrow Teeth, plain or headed, ⅝-inch and larger per 100 lb.....$2.55@$2.80

Thermometers—

Tin Case, Cabinet, Flange, Dairy, &c.....30@35%

Ties, Bale—Steel Wire—

Single Loop.....82½&10%
Monitor, Cross Head, &c.70&2½%

Tinware—

Stamped, Japanned and Pieced, sold very generally at net prices.

Tops, Chimney—

Iwan Volcano Chimney Tops.....55%

Tools—Coopers'—

L. & I. J. White.....20@20&5%

Haying—

Myers' Hay Tools.....50%

Ice Tools—

Gifford-Wood Co.....15%

Saw—

Atkins' Cross Cut Saw Tools....35&5%
Simond's Improved.....33⅓%
Simonds' Crescent.....30%

Ship—

L. & I. J. White.....25%

Torches—

Hammers, Engine, ₱ doz.....$1.50

Traps—Fly—

Balloon, Globe or Acme, doz., $1.15@$1.25; gro....$11.50@12.00
Harper, Champion or Paragon, doz., $1.25@1.40; gro.$13.00@13.50

Game—

Imitation Oneida.....75@10%
Newhouse .....50&5%
Hawley & Norton.....65&10%
Victor .....75@75&10%
Oneida Community Jump.....70&5%
Stop Thief.....60%
Tree Trap.....60%
Hector .....75@75&5%

Mouse and Rat—

Mouse, Wood, Choker, doz. holes, 12¢
Mouse, Round or Square Wire, doz.85@90¢

Trowels—

Disston Brick and Pointing.....25%
Disston Plastering.....20%
Disston " Standard Brand " and Garden Trowels.....30%
Kohler's Steel Garden Trowels, ₱ gro., 5 in., $4.80; 6 in., $6.00.
Never-Break, Forged Steel Garden Trowels, in 1 doz. boxes, ₱ gro. $6.50
Woodrough & McParlin, Plastering.25%

Trucks, Warehouse, &c.—

McKinney Trucks.....each, net $10.00

Tubs, Wash—

No. 0 1 2 3
M'fr's list, price per gross, subject to discount of 10&7½&5&5 &10&5%.
Galvanized.....$67 $79 $91 $103

Twine, Miscellaneous—

Flax Twine:
No. 9, ¼ and ½-lb. Balls.21@23¢
No. 12, ¼ and ½-lb. Balls.19@21¢
No. 18, ¼ and ½-lb. Balls.16@18¢
No. 24, ¼ and ½ -lb. Balls. 15½@17½¢
No. 36, ¼ and ½-lb. Balls.15@17¢
Chalk Line, Cotton ½-lb. Balls .....24@29¢
Cotton Mops, 6, 9, 12 and 15 lb. to doz.....8½@21¢
Cotton Wrapping, 5 Balls to lb., according to quality..13½@21¢
American 2-Ply Hemp, ½ and ½-lb. Balls.....12½@18¢
American 3-Ply Hemp, 1-lb Balls .....13¼@16¢
India, 2-Ply Hemp, 1½-lb. Balls, Balls (Spring Twine)...7½@9¢
India 3-Ply Hemp, 1-lb. Balls 7¼@9¢
India 2-Ply Hemp, 1½-lb. Balls, 7@8½¢
2, 3, 4 and 5-Ply Jute, 1½-lb. Balls .....9@11¢
Mason Line, Linen, ½-lb. Bls.17¢
No. 26½ Mattress, ¼ and ½ lb. Balls, according to quality. 30@60¢
Wool, 3 to 6 ply....B 6¢; A 7½¢

Vises—

Solid Box.....60@60&10%

Parallel—

Fisher & Norris Double Screw Leg, each, Nos. 2, $10.50; 3, $16.00; 4, $20.50; 5, $27.00; 6, $32.00.....20%
Fisher-Brooks Bench, and Woodworkers' Vises, No. 0, $3.80; No. 1, $5.90; No. 2, $8.25; No. 3, $10.50; No. 4, $13.50.....40%
Lewis Tool Co.:
Adjustable Jaw.....30%
Monarch, 50%; Solid Jaw.....50%
Merrill's 25%
Millers Falls Oval Slide Pattern.60&10%
Parker's:
Victor, 20@25%; Regulars....20@25%
Vulcan's .....40@45%
Combination Pipe.....55@60%
Prentiss .....20@25%
Pullman Automatic Bench, ₱ doz., No. 1, $7.50; No. 2.....$9.50

Pipe—

Curtis & Curtis Malleable.....25%
Parker's Combination:
87 Series, 60%; 187 Series, 60&5%; No. 870, 40%.
Prentiss Vise Co.:
Patent, Bicycle, Shepard, Gipsy, Adj. Column, Lewis Adj. Jaw..25%
Rapid Transit, Heavy Chipping..30%
Bull Dog, Anchor Line, Yankee Quick Lever, Lewis Solid Jaw, Eclipse Wrench Attachment....4%
Monarch 45%
Vise Jaw Ca.s 10%
Prentiss 60%

Saw Filers

Disston's D 3 Clamp and Guide, ₱ doz., $24.00, 30%; Clamps.....30%
Reading .....50&10%

Wood Workers—

Prentiss Cabinet Makers'.....40%
Wyman & Gordon's Quick Action, 6 in., $6.00; 9 in., $7.00; 14 in., $8.00.

Wads—*Price per M.*

B. E., 11 up..... 60¢
B. E., 9 and 10..... .70¢
B. E., 8..... .80¢
B. E., 7..... .80¢
P. E., 11 up.....$1.00
P. E., 9 and 10..... 1.25
P. E., 8..... 1.50
P. E., 7..... 1.50
Ely's B. E.,11 and larger.$1.70@1.75
Ely's P. E., 12 to 20....$3.00@3.25

Dis. 15%

Ware, Hollow—Cast Iron, Hollow—

Stove Hollow Ware:
Enameled .....45&10%
Ground .....50&5%
Plain or Unground.....60%
Country Hollow Ware, per 100 lbs .....$2.75@$3.00
White Enameled Ware:
Maslin Kettles.....65&10%
Covered Wares:
Tinned and Turned.....35&10%
Enameled .....45&10%
See also *Pots, Glue.*

Enameled—

Agate Nickel Steel Ware.....33⅓%
El-an-ge .....60&10%
Iron Clad Ware.....70&10%
Lava and Volcanic, Enameled..40&10%

Tea Kettles—

Galvanized Tea Kettles:
Inch 6 7 8 9
Each ..... 45¢ 50¢ 55¢ 65¢

Steel Hollow Ware—

Avery Stamping Co.:
Never-Break Spiders and Griddles .....65&10%
Steel Kettles, Maslins Scotch Bowls, Tin'd.....60%
Steel Stew Pans, Stew Pots, etc., Porcelained 50%
Cleveland Stamping & Tool Co.:
Solid Steel Spiders and Griddles .....65&5%
Solid Steel Kettles.....60&5%

Warmers, Foot—

Pike Mfg. Co., Soapstone....40@40&10%

Washboards—

No. ₱ doz.
800—Brass King, Single Surface, Open Back.....$2.80
862—White Hen, Spiral Grimp Glass $3.35
964—Royal Blue Enamel, Single Surface, Ventilated Back.....$3.35
172—Our Best, Single Zinc, Soap Drainer $3.35
722—Soap Saver, Single Zinc, Iron Top $3.35
100—Northern Queen, Single Zinc, Perforated, Open Back.....$3.00
134—Universal, Single Zinc, Extra Family Size, Ventilated Back....$2.80
760—Banner Globe, Single Zinc, Ventilated Back.....$2.25
57—Peerless, Double Zinc, Spring Protector $3.70
56—Red Cross, Double Zinc, Swing Protector $3.60
17—North Star, Solid Zinc, Swing Protector $3.60
797—Jewel, Single Zinc, Pail Size.$1.25

Washers—Leather, Axle—

Solid .....90@90&10%
Patent .....90@90&5%
Coil: ⅞ 1 1¼ 1¼ inch.
9¢ 10¢ 11¢ 11¢ per box.

Iron or Steel—

Size bolt.... 5-16 ⅜ ½ ⅝ ¾
Washers....$4.90 4.00 2.70 2.50 2.30
The above prices are based on $6.50 off list.
In lots less than one keg add ½¢ per lb.; 5-lb. boxes add ½¢ to list.
Avery Stamping Co.:
Standard, in 200 lb kegs, $6.00 ₱ 100 lb. discl.; in 100 lb kegs, add 10¢ net ₱ 100 lb; in 5 or 10 lb boxes, add 50¢ net ₱ 100 lb; in 1 lb boxes, add $1.00 net ₱ 100 lb.

Cast Washers—

Over ½-inch, barrel lots, per lb. 1½@1¾¢

Wedges—

Oil Finish.....lb., 2¼@2¾¢

Weights—Hitching—

Covert Mfg. Co.....30&2%

Sash—

Per net ton.....$24.00@$25.00

Wheels, Corundum and Emery—

Pike Mfg. Co., Corundum, 65%; Emery 75%

Well—

8-in., $2.00; 10-in., $2.30; 12-in., $3.00; 14-in., $4.45.

Wire and Wire Goods—

Market and Stone Wire in Bundles—

Bright and Annealed:
9 and coarser.....80%
10 to 18.....80&10%
19 to 26.....80&10&2½%
27 to 36.....80&5%
Galvanized:
9 and coarser.....75&10%
10 to 16.....75&10%
17 to 26.....72½&10%
27 to 36.....72½%
Coppered:
9 and coarser.....75&10%
10 to 26.....75&10%
27 to 36.....70&10&5%
Tinned:
6 to 18.....75&10&10%
Brass.....15¾¢ lb., base
Copper.....14⅜/10¢ lb., base
Cast Steel Wire.....50%

Spooled Wire—

Annealed and Tinned, 70&10&10&10%
Brass and Copper...60&10&10&10%
Retailers' Assortments, per box. $1.90@$2.10

Bright Wire Goods—

Steel Wire Goods.....90&35%
Brass Wire Goods.....90&35%
Brass Cup and Shoulder Hooks, 85%

Wire Cloth and Netting—

Galvanized Poultry Netting, 80&10@80&10&5%
Screen Cloth, 12 Mesh, Per 100 sq. ft.; Painted, $1.35; Galvanized, $1.95; 14 Mesh, Bronze $6.50.
Standard Galv. Hardware Grade: 100 ft. rolls, 2½ to 48 in. wide, Per 100 sq. ft.
Nos. 2, 2½ and 3 Mesh....$2.75
Nos. 4 and 5 Mesh.....$3.00
No. 6 Mesh.....$3.25
Nos. 7 and 8 Mesh.....$3.75

Wire, Barb—See *Trade Report*

Wrenches—

Agricultural .....75&10@80&5%
Alligator or Crocodile.70&10@75%
Baxter Pattern S Wrenches, 70&5@70&10%
Drop Forged S.....45@45&5%
Acme .....60&10%
Alligator Pattern, 70%; Bull Dog..70%
Bemis & Call's:
Adjustable S, 40&5%; Adjustable S Pipe, 40&5%; Briggs Pattern, 40%; Combination Bright, 50%.
Steel Handle Nut.....50&5%
Combination Black.....50&5%
Merrick Pattern.....50&5%
Coes' Genuine Knife Hdl...40&10&5&5%
Coes' Genuine Steel Hdl...40&10&5&5%
Coes' Genuine Key Model..40&10&5&5%
Coes' Genuine Hammer Handle..... 40&10&5&5%
Coes' " Mechanics' "...40&10&5&5%
Hercules 70%
W. & B. Machinist:
Case lots.....50&10%
Less than case lots.....50%
W. & B. Railroad Special:
Case lots.....50%
Less than case lots.....40&10&5%
Solid Handles, P., S. & W...50&10%; full cases.....50&10&5%
Vulcan and Acrippa Chain.....50%
Wizard Adjustable Ratchet.....50%

Can and Jar—

Benj. P. Forbes Triumph, doz., $0.75; Triumph Syrup Cap, gro. $4.00

Wrought Goods—

Staple Hooks, &c., list March 17, '02.....90@—%

Zinc—

(Cask lots, 600 lb., at mill.)
Sheet.....per 100 lb., $7.50

For the Table of "Current Metal Prices" see the First Issue of Every Month.